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# User Experience Design within the Sharing Economy and Collaborative Consumption:

## A case study of the SpaceMaker company

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ABSTRACT OF
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The Internet has played a major role in the development of Sharing Economy communities as well as helped spread awareness and reach for Collaborative Consumption communities. Web services regarding these topics have become very popular in many countries, but there seems to be a problem regarding the motivation of users into the engagement within these communities. The major barriers seem to be the inconveniences (such as security issues, transportation of goods and communication) when interacting and the triggers to start doing so. This project proposes an online application to help solve these issues. By motivating the user to organise and catalogue her possessions at home, the tool helps bring the intentions of organising and transforms them into intentions (and actions) of sharing, by applying gamification methods, behavioral changing models and a complementary service system for the SpaceMaker company.

Using the companies established remote storage as a service sollution, the tool proposes the sharing of items as a new way of solving the problems of house organisation and storage space. The design was carried as a human-centric process: Provided with an extensive market research, some user personas were identified and documented. Five fitting users were then approached and interviewed in two separate rounds. A first round to tap into the needs and wants and a second round to see reactions to technological solutions to the problems found. With these results several user journeys are proposed and the user experience is designed following the companies restrictions on it's identity. An initial implementation was started which should provide a solution to transforms user's intentions of organising at home to actions of sharing within these Sharing Economy and Collaborative Consumption communities. These results represents the bases for the a new line of products for the SpaceMaker company which will have to be user tested and iterated upon in order to make a more compelling impact in the users.

**Keywords:** user experience, sharing economy, collaborative consumption, organization, service package model

**Language:** English

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Thank you to my family and my parents especially. They will probably never read this, but this is for them.

Thank you Finland and Sweden for showing me, during the harshest of winters, that there is, indeed, within me an invincible summer.

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Andrés Sierra Sierra

# Contents

# Chapter 1

# Introduction

We live in a consumerist society. Advertisement comes from everywhere and we are bombarded in a daily basis with information about what things to buy, how to take care of ourselves using a certain product, what clothes to wear, what car to drive, even what ideas to think.

As this consumerism has increased, so has our awareness of the impact that it is having on our lives, our society and our planet. Sustainability has become a hot topic around the world in many areas of study. Our rate of consumption and production is becoming more and more visible, and we are starting to consider what possibilities are there to mediate this problem.

## 1.1 The Sharing Economy

In her famous TED talk "the case for Collaborative Consumption", Rachel Botsman [1] clearly states this problem with a simple example: most of us have tools at home and we tend to think that it is an imperative that each home is adequately equipped with them. What this has generated is a massive consumption on power tools for the house, like an electric drill. Many of us buy them and add it to our tool collection. What is surprising is that, according to her studies, an average drill in Australia is going to be used for fifteen minutes in its lifespan.

What we have seen rising from all of this is what we call the sharing economy as a countermeasure to consumerism. As its name suggests, it proposes a new economic model in which there is an exchange of underutilized assets for monetary or non-monetary benefits [2]. This way, instead of buying

[1] `https://www.youtube.com/watch?v=AQa3kUJPEko` accessed August 28, 2016

[2] `http://www.fastcoexist.com/3022028/the-sharing-economy-lacks-a-shared-definition/8` accessed August 28, 2016

30 power drill, one for each house within a community, to be utilized for 15 minutes each in total, one power drill can be acquired and shared by all members of the community. Of course, new challenges arise, like ownership of the shared products or responsibility behind their consumption, but all those problems are outside of the scope of the project.

The sharing economy is therefore conformed by a group of people- the community willing to participate in it - Â and the different products or skills that are available for trade. It is important to note, that within this sharing economy, not only are tangible products offered, but also services that in term will be provided by the members of the community. Within this sharing economy model there are several sub-models to consider, and they all have to deal with the way the different parties interact with one another.

## 1.2 Collaborative Consumption

A COLLABORATIVE ECONOMY happens when the members of a community create an economic network that has no centralising entities.

When this network starts sharing underutilized assets with one-another, it is called a SHARING ECONOMY. When technology steps in and aids in these transactions it is called a COLLABORATIVE CONSUMPTION community[21]. The Internet has played a major role in the creation of these communities and has facilitated the communication within. There are now many different platforms that participate in the Collaborative Consumption and aid you in creating your own Sharing Economy with the people near you, or the people who have similar interests as you [3]. Hamari et. al. propose that the Collaborative Consumption happened thanks to the rise of the Web 2.0. Once the information flow was bidirectional, these communities started to emerge. Social networks play a major role in the development of the Sharing Economy, and peer-to-peer interaction decentralized the idea of consumption.

However, the sharing economy is not without its problems and drawbacks. Many CC solutions have encountered legal opposition and in some cases violent opposition from the people [31]. Such is the case of those communities that introduce ways to create unfair competition to already existing services. Take Uber for example [4]. Within their platform, one person can become a driver offering her services with her car, and at the same time, another person requests the service and pays for it, as said before, directly in a peer-to-peer transaction. For some people, especially the ones who are in the taxi/cab

[3] `https://www.justpark.com/creative/sharing-economy-index/` accessed on August 28, 2016

[4] `https://www.uber.com/` accessed on August 28, 2016

market, this is unfair competition, as Uber drivers are not obliged to pay extra fees that traditional cab drivers are appointed. The Sharing Economy thus creates new opportunities and challenges for the political powers around the world.

Some people also consider that this phenomenon is more a culture of disguised pseudo sharing [5], or that it might even increase other collateral damage and problems [9]. By using semantic techniques, the idea of sharing is proposed to a community, which agrees to participate, only to find that they are not truly sharing anything, but rather having normal trades as any market would. The author explains that true sharing requires altruism, which is evident in some of the platforms available, but is lacking - and in some cases opposed- in most Sharing Economy services.

## 1.3 Problem Statement and research questions

The Sharing Economy and Collaborative Consumption face several issues. The biggest one being the trust aspect behind the sharing of goods [10].

Another big issue is that of motivation [6]. People need a trigger to start caring and sharing. These triggers vary according to cultures and contexts [2].

Gioia Deucher[5] explains that if these barriers are overcome, there is no stopping for these phenomena. It is a natural step on the evolution of our society and culture.

Therefore, the objective of this project is to find a new trigger for user's to engage in the Sharing Economy and Collaborative Consumption communities as well as understand more about the phenomenon of people's behavior in the Sharing Economy and their incentives.

Are there better methods of persuasion into the Sharing Economy than the societal drives? What methods of persuasion could be implemented for this matter?

Furthermore, is it possible to create an initial implementation of these ideas and concepts to start experimenting with, and for SpaceMaker to use as research material for their concept expansion?

[5] `http://nextrends.swissnexsanfrancisco.org/forget-owning-lets-share/` accessed on August 28, 2016

## 1.4 Importance of the Sharing Economy

Whatever the view that one might have to the matter it is impossible to deny the power that the Web 2.0 has provided and the endless possibilities that it proposes. Böckman (2013)[7] makes a clear depiction of why the Sharing Economy is a global phenomenon that is taking over and only seems to grow. He argues that the mixture of societal drives, technological drives and economical drives are in the right place at this point of time. A perfect storm with all the elements necessary aligning and making it easier, logical and convenient that it happens, yielding great opportunities to both the business side and the consumer side, with the technology serving as an intermediary device to grease the wheels of this machine.

In the end, this solution will create a better opportunity for different societies to thrive on [13]. The Sharing Economy seems to be working as a leverage for disadvantaged communities to overcome their problems and achieve a better lifestyle even though this is not the a concern for the Sharing Economy.

The sharing economy is not a new idea. It is certainly not something that people in Finland have not heard about. After all, services like Uber and Air BnB already operate in different cities. However, the idea of self storage as a service and the combination of these two is an innovation that is yet to arrive to the Finnish market, and it is a promising one [1][38][6].

By tapping into a condition that is very common among city inhabitants, a solution can be implemented to help the user in an almost invisible way. After all, sorting, managing and moving ones belongings is not a task that many do willingly and comfortably. This needs to be carried out applying a correct use of a Technology Acceptance Model [25].

[6] `http://www.economist.com/news/leaders/21573104-internet-everything-hire-rise-sharin` accessed on August 28, 2016

# Chapter 2

# Literature Review

## 2.1 Defining User Experience

In his book "Observing the User Experience: A Practitioner's Guide to User Research", Mike Kuniavsky talks about what it is that makes a good experience for the user of a product. He argues that for a product to be considered 'usable', it has to be "functional, efficient and desirable to its target audience" [28]. This means that the delivered product needs to be useful to its users, as well as easy to use. People want to get things done fast. The third aspect is, however, the most difficult to grasp, as it talks about an emotional response from the user. As opposed to the other two characteristics, this emotional response is quite difficult to measure, quantify and maximize when developing a product.

Nevertheless, Kuniavsky manages to define the user experiences for an information management product as three general categories of work: Information Architecture, Interaction Design and Identity Design.

These are the key points that will shape the way a user handles a product and how she interacts with it. As we can see, the user experience is therefore not confined to the looks or aesthetics of the tool. This is part of the experience, but it is only the visual experience.

One can argue that user experience extends to the human senses, as it is through our nervous receptors that we perceive the world and later the brain interprets it. Certainly, the user experience can not be bound to the aesthetics, as it would be dealing with only one of the senses.

Furthermore, Hassentzahl and Tractinsky [22] argue that the user experience not only deals with the human senses but goes beyond that. The goals, expectations, and mood of the user play a definitive role in it. They also add a very important aspect: temporality. This means that a user experience

is bound both by the circumstances and by time. A user experience then extends beyond the product to either end of the time line: the experience before interacting with the product, and the experience after interacting with the product.

This supports Kuniavsky's idea that a good user experience should then be desirable by the user. This desire starts before the first interaction in many ways. Advertisement and marketing of the production company play an important role with this, as this is the initial contact that users will have prior to having the product. Later on, during the first interactions, the user should feel comfortable and should find the product useful enough to create memorability. This will generate future desire that will drive the user to keep coming back and interacting with the product over and over again.

Another interesting matter regarding the user experience and UX design is the fact that it is subjective [30]. According to the survey conducted by Law et. al., the majority of HCI lead researchers agree that the experience lies within the individual. Society and other users can help define it, but it is over all a phenomenon in the mind of a single user. This strengthens Kuniavsky's idea, that one of the most important steps in the User Experience design is that of concretely defining the user and her goals, needs and wants [28]. Therefore, a correct design should create unique experiences in the individual, but it should be easily replicated within each member of the user group. The profiling of the users becomes of utmost importance for the process.

For further information and readings, Law et. al [30] have gathered a good compendium of references and bibliography around the subject.

## 2.2 Product Experience Design

As we can see, the user experience is an individual perception that extends beyond the interaction of the user with the product. A correct user experience design also goes beyond the design of a single product or service and tends to relate to the design of a group of services or a platform in which these services work. This design can be narrowed and downscaled by applying Product Experience design. In this counter position to the aforementioned experience, Desment and Hekkert [11] propose a new way of looking at the experience and breaking it down into shorter and more concise portions.

The product experience deals with the affective responses between a product and a user. This way, the experience is still individual (subjective) and circumstantial, but the temporal aspect is reduced to the direct interaction.

## 2.3 Persuasion and Behavior Change

One of the biggest concerns within the project is that, no matter how easy a platform or service makes it for users to share and trade, if there is no will to share, no real desire for engaging in this practice, the service is rendered useless. If the idea is to design a service for the sharing economy, to explore the possibilities of entering this field that is already thriving with tools and solutions, it is important to think of a good way to get users flowing into the system. As shown before in figure 3.1, if we take the sharing economy as the core package, designing for the sharing economy means that one has to design not only the experience of the sharing platform, but the enabling and enhancing services as well. Here is where persuasion comes into play.

Chiu et. al. [8] propose a model to investigate the motivations behind some of these sharing platforms. What really gets people going?. They found that motivation lies in two major factors: an already existing exchange of ownership and knowledge that is active and valuable, and that this flow is dynamic and constant. This would suggest that within the on-line sharing communities, people do as people see. Users replicate actions of other users, as if people prefer to go with the flow of a river, rather than create a new one.

This raises a major concern in any design, as it appears to be trying to solve a problem similar to the chicken and the egg conundrum. A cycle that is only powered by it's past revolutions. Just like a Newton's Cradle, it has the potential to become an everlasting machine, but it needs an initial push. Some invisible hand to give that first revolution and get things going.

In a related note, Belk (2014)[6] argues that sharing is as old as humanity. It is a natural habit of humankind. The sharing Economy and the Collaborative Consumption, however, are synthetic phenomena that appear thanks to the Internet. This idea seems to support the perfect storm mentioned earlier, but more importantly, the author suggests that due to the appearance of these new phenomena the old saying of "you are what you own" will have to be rewritten as *"you are what you can access"* once the transfer of ownership and possession becomes blurry within the sharing communities. According to his findings, sharing itself should act as motivation enough for people to give that initial push. After all, the environmental and societal problems that can be addressed with sharing will ease users into participating and promoting such platforms. Designers play a major role in this behavioral change model. As seen in the user experience design section, a correct design in experience, in all its temporally (again, enabling and enhancing services to the core factor) will keep the cycle going [3].

Fogg (2009)[14] has an interesting look at persuasion and presents his behavioral model. Persuasion happens in the form of objectives. The desired behavior becomes the beacon towards which the participants aspire. Now, in order to reach this target behavior, a person needs three things: motivation, ability and triggers.

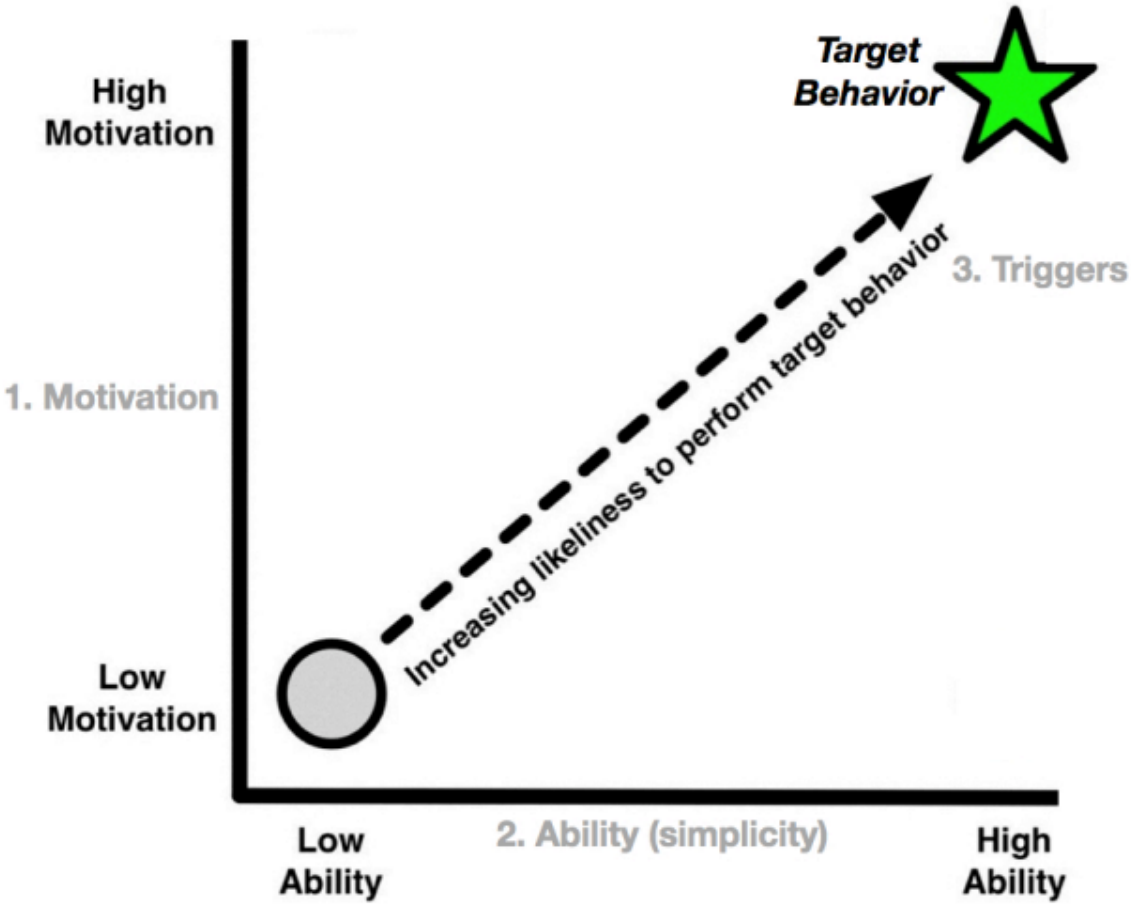


Figure 2.1: Fogg's Behavioral Model with it's three factors.[14]

What is interesting to note is that the target behavior lies in high motivation and high ability (or simplicity), but the most important aspect are the triggers that will guide the user into the upper right corner of the plane.

Notice how ability is also described as simplicity. This suggests that a correct user experience design will enable this high ability factor that is necessary. The motivation should come from the set of enhancing services, and the enabling services act as triggers for the model.

Triggers can come from other places as well. Kwon et. al [29] say that the sense of belonging to a network can act as motivation enough to participate in the activities designed for that specific network. A sense of belonging usually gives the participants a much better motivation than any other reason. Social problems and other aspects in the surroundings are great triggers for initial engagement within a network. Here is where sustainability plays a big role, and this is why environmental problems and solutions should act as triggers for the system as well. The suggested problems and the idea of solutions within the social networks and communities on-line serve as good reinforcement for the behavior of the participants. It is not a matter of just the sense of belonging, but also the sense of importance within the network of people.

All this said, however, there is an argument on the other end of the spectrum that is of interest when talking about persuasion and behavioral change: negative reinforcement. Kirman et. al. [27] have found that behavioral psychology is the best tool in designing persuasive technologies. In their research, they found that behavior is conditioned by the environment, the circumstances under which an action is being taken. Behavior is a process of knowledge and learning. The user experiences her environment and through the feedback given by it, she learns and adapts her behavior in order to get the results she wants during the next interaction with the same circumstances. Therefore, if a system is able to manipulate the circumstances of the experience, it could influence the user's experience and ultimate change her behavior.

It is important to note then, that in order for this to happen, clear feedback has to be given to the user after the experience. She needs to see how things happen differently and how the system gives different feedback according to what input she is giving. This is done through a mechanism called reinforcement.

Reinforcement comes in two fold: positive or negative:

*"Positive reinforcement describes a situation where the presentation of a stimulus as a consequence of an instance of behaviour makes that behaviour more likely to occur in that context in future."[27]*

*"Negative Reinforcement describes a situation where the removal of an existing stimulus as a consequence of an instance of behaviour makes that behaviour more likely to occur in that context in future"[27].*

As we can see, positive reinforcement comes when the user does something that the system was expecting. Negative reinforcement, contrary to popular belief, happens when the system reacts positively when the user stops behaving in a certain manner.

A third type of feedback is also mentioned by the authors and seems to be

quite powerful: punishment. This happens when the system reacts in such a way towards the user, that she gets a stimulus back -usually not pleasant for her - that is triggered by something the user did, or a specific way she behaved.

The research shows how using this last method can have a great effect in the change of behavior of users. The authors argue that even though persuasive technology has been mostly driven by positive reinforcement, which happens by giving the user some kind of reward after her actions. However, the lack of actions, or negligence, is not taken care of by the system, and the rewards are not available. This seems to be counterproductive for behavioral change, as user engagement ends the moment the reward is not visible.

This argument can be complemented with Donald Norman's famous quote about feedback for the user:

*Poor feedback is worse than no feedback at all[33]*

## 2.4 Motivation, Habit Forming and Gamification

There are many ways that a system can implement rewards as a feedback mechanism and create user retention and behavioral change. Customer reward programs are very common these days and almost all companies that use this technique reward their customers for direct and active participation within their systems.

User retention is highly valuable for a company and is fundamental for creating a brand [26]. These reward programs are so effective that some companies have even started using a prepaid system for their customer loyalty programs. Such is the case of Starbuck's Coffee or Panera.

Where persuasion works for the enabling layer of the service package of a product or service, it is customer retention mechanisms, like customer loyalty, that act upon the enhancement layer of the model. This way, we can say that the service package model can be complimented as follows:

These tap on the motivation for the user to interact and expand the experience with a product, service or brand. The interesting part of motivation is that it actually deals with feedback from the system to the user. If the product experience is well designed, the element of desirability becomes the motivation to come again and again to the product or service. Motivation, persuasion and the correct user feedback leads then into habit forming.

In this later stage, the user is expected to return and interact with the system, not for the sake of the reward, but to continue a routine that has been

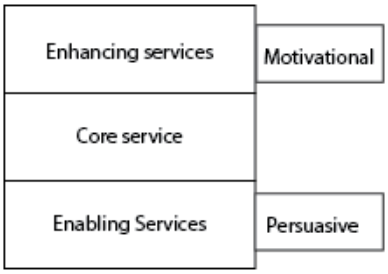


Figure 2.2: Service package model revisited

established as a direct effect of motivating continuous interaction. There are several mechanisms that can be implemented for these purposes. As discussed above, customer loyalty programs are one of the most common tools but it is not the only one.

Recently, a new buzzword has been going around the user experience design field that deals with these issues: Gamification.

According to Hamari et. al. [24], gamification is *"a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation"*.

The field of gamification is growing largely and there is a good amount of research going on at the moment thanks to the clear success that it is having in its application in the industry. There are several schools of thought regarding what gamification and games mean and how these words can be used, or rather, how they shouldn't be used.

Notice in the definition how gamification refers to *"gameful experiences"*. This should immediately raise some concerns within people, as the noun game is being turned into an adjective. From the very beginning we can see then, that gamification is not a goal, but rather a means to achieve a certain goal, but in order to better understand this definition, one must understand what games are and how they work.

There are many definitions to the concept of game. they move from the very conceptual and abstract, to the more concrete and precise. It is not within the scope of this project to try and explain the concept of games nor reach a definition for it. Instead, since gamification is the act of making gameful experiences, one needs above all, to understand how games work.

As the authors explain, in order to understand games, one must understand its parts. All definitions found talk about two major components in games: a systematic component that deals with rules and boundaries, and an experiential component that happens when a user agrees to act within

the limits of set boundaries. There is therefore an intrinsic contract between the game and the player that is extremely strong and rigid. So much so, that playing outside of the set boundaries is considered as an action lacking in morality in most cultures around the world, in other words, cheating.

A gameful experience can be understood as the use of these systematic components of games, within a system that normally does not need them to function. This implies that there is a clear differentiation between games and gamified environments or gameful experiences. For the latter, rules and boundaries serve as motivation and persuasion for the user. They become part of the extra layers of the service package.

In his studies, Hamari (2013)[17] found that gamification can actually be used for those purposes and can help increased the perceived value of a system from the user. The research showed not only that, but user engagement and participation also rose.

The most basic of all gamification elements are achievements. It is the cornerstone of this tool and it is through achievements that gamification engages and motivates users[19]. These achievements are the rewards for the user's engagement with the system and are, in one way or another, quantified. This quantification allows for the system to create larger and more complex goals for the user to achieve, by manipulating the different parameters within it.

What achievements eventually lead to is to the famous PBL system in gamification, as explained by Kuo in his gamification blog [1]. PBL stands for *'Points, Badges and Leaderboards'*, and is the basic framework for any gamified environment. What Kuo suggests for the process of creating a gamified experience is the following: It all starts by defining goals. These should be should be specific for each system and it is up to the designer to define how complex and difficult these goals should be. The most important characteristic is that they should be quantifiable, and if they are not, the designer should come up with a way to quantify them. The goal of this is not to make the system reward-driven but rather to keep the motivation levels high. Therefore, a lean learning curve is recommended, otherwise the engagement level is compromised. If the goal seems too complex, perhaps it is better to break it into smaller, more reachable milestones for the user. Next, it is important to let the user know how to reach goals. Make it visible for the user which parts are the ones being evaluated and keep track of the progress. A user is more motivated if she sees that she is approaching completion of a goal or at least making progress.

Once a goal is completed, a reward should be attached to it. These

[1] `http://www.gamification.co/` accessed on August 28, 2016

rewards should be given according to the difficulty of the task.

Finally, keep track of all previous work done by the user, as it is through reviewing that a user becomes motivated. By checking on what she has done, the user can reassure that the process has been successful.

When possible, make it available for the user to share her accomplishments with others interested in the same matter.

Gamification is a vast territory at the moment, because of it's youth and potential. As stated before, much has been researched in the past few years regarding it [20] [18] and much more will be researched in the near future. It is a hot trending topic within the technology world and one way or another, it is permeating all aspects of it. Learning how gamification works,it's benefits, it's drawbacks, and, above all, how it can be successfully implemented, is a challenge and a great opportunity for anyone entering this field, as it is definitely an opportunity and strategy to tackle both the enabling and the enhancement layer of a service [12].

In the end, the project aims at helping SpaceMaker find a solution for the storing and sharing of people's belongings by becoming part of the sharing economy and developing a collaborative consumption network as well as developing an initial prototype of a mobile application to help manage it. To do this, the solution should try to change people's behavior, especially in cataloguing their belongings. Therefore, a motivational environment will be necessary; gamification will be evaluated for this purpose. In the end, the final product should help create value both for the customer, as it helps solve their problems and needs, as well as the company by competing in this sharing economy.

# Chapter 3

# Context of the case study

SpaceMaker is a start up company based in the Otaniemi area in the city of Espoo, Finland. It was born in late 2014 and focuses mainly in Self Storage as a Service. This means that the company provides software solutions to different key players in the sector to handle the logistics and inconveniences when dealing with storage of items, both for businesses and particulars, and self-storage, specifically. SpaceMaker currently operates within the Open Innovation House in Espoo, where the EIT Digital Helsinki offices are hosted.

## 3.1 Key players

Within the SpaceMaker ecosystem, there are two main stakeholders: the logistic operators and the end customers. The first group is comprised of those companies who handle day-to-day pick-up, delivery and storage solutions for various customers. Post offices, warehouses and self storage warehouses are examples of these kind of stakeholders. They deal with big logistic challenges to carry out their business.

The latter group is the end customers, the people who are in need of the services provided the first group. As there is a big amount of infrastructure involved in the process, with warehouses, shipping trucks, personnel, etc. this makes SpaceMaker a localized service. It can not spread viraly as a digital-only service, but rather needs to do so in a slower pace in order to guarantee the satisfaction, both for the users and for the company.

## 3.2 The SpaceMaker product

Currently, SpaceMaker has been working on its first product, the SpaceMaker App. With this, they are trying to get a connection between the stakeholders

and alleviate their pains within the different processes.

The SpaceMaker App is under development on its MVP stage. At its core, the use case is as follows: End Customers have storage needs. They need to organize, pack, bundle and store their belongings in a way that is efficient, both time wise and in space consumption at home. When the user finds herself out of storage space at her home, or she simply wants to optimize the space she has, and therefore uses the logistic operator's services to accomplish this.

At this point some of the main problems emerge. She needs to look for a storage solution that is hopefully near her home. Find out about plans that these places offer, reserve and then transport the belongings she wants to store to the chosen warehouse by herself, or hire third-party mover solutions to do this. Once the items are stored in the warehouse, it is up to her to keep track of her inventory, periodically check that things are in good condition and eventually make journeys to the warehouse in order to retrieve items or check status of such items.

The SpaceMaker App aims to solve this user's pains by concentrating all the things necessary for the process to take place into one location. By teaming up with logistic operators that provide remote storage solutions, the user needs not to worry about location or availability. She orders storage boxes- in different sizes- directly from the App which she receives at her doorstep. Once there, she can fill these boxes with the stuff she wants to store remotely and catalogues the items by taking pictures of them and relates them to the box they are in. Once this is done, she orders a pick up for the boxes, also from the app, and the logistics operator will come and take away the boxes to store them in a secure and reliable place. Later on, the user needs only to check the App in order to refresh her memory on the items on storage and, in case she needs any items back, she can easily order a return of any number of boxes. Finally, the user is charged a monthly fee per box stored -as well as for transportation- and not for a whole warehouse or self-storage space, hopefully resulting in saving money and time.

The idea for this App is not to become a frequently used one by the user, but rather to be very precise and specific whenever she happens to request some information relevant to the subject.

Because of this, SpaceMaker hired a group of designers from Idean to help create a proper user interface and user experience for their basic App. A detailed report on their work, with indications towards graphical specifications as well as user navigation was provided.

## 3.3 Other products

In order for the previously described use case to work properly, several other side products also inhabit the SpaceMaker ecosystem. These are not main products, as they are not part of the MVP and they are not essential to the system, however, they improve the user experience.

First of all, if there are two key stakeholders within this use case scenario, it is only natural that SpaceMaker thinks of a way to represent and cater to the needs of each of them. Such is the case of the SpaceMaker App for the end user.

For the logistics operator, a second application is under development. This one is quite different to the existing one, as it does not deal with packing and reviewing personal belongings, but rather aiding in setting up the logistics for transportation and storage of the boxes. SpaceMaker wants to make it as smooth as possible for these operators to start implementing their storage solutions within the SpaceMaker ecosystem.

This administrator application deals more specifically with location of boxes and items and management of requests coming from users. However, the details of this are irrelevant for this work and will therefore not be thoroughly explained here. There is currently no graphic or usability specs for this.

The other side product within the ecosystem are the boxes used to store the user's belongings. These boxes need to be quite sturdy and reliable. They need to withstand different temperatures and climates, as they will spend significant periods of time in storage. They are made of a durable material as they will be used by many different users with different handling methods.

Also, not only should these boxes be durable, but they yield a special characteristic that is unique to the SpaceMaker boxes and it is the SpaceMaker code printed on them. This code is used by both the logistic operators and the users alike. the first to identify the boxes within the warehouses and storage facilities and the latter to bind the boxes to the catalogued elements that they are packing or have packed before.

All these elements constitute the building blocks of the SpaceMaker core concept and service. the idea of Self Storage as a Service. SpaceMaker provides a service that is existent in real life and in the digital world in parallel and it is when these two worlds work together that the visions of the company follow through and succeed.

## 3.4 SpaceMaker concept expansion

One very important aspect of space maker is the fact that they combine real world, tangible problems and solutions with virtual ones. It is not a service that can run exclusively on one of those two worlds.

This presents the company with a great advantage. As they appeal to tangible problems, it is easier for users to identify with it and grasp the idea. The value proposition is not abstract and therefore very easily identified.

This is also a disadvantage on the other hand, as expansion and scalability of the service is physically bound by the logistics partners and the infrastructure involved in it. This means that entering a new market or even expanding the service within a market (into a new city for example) constitutes a higher investment and therefore risk than that of a virtual only service company.

In order to have a probing mechanism and "test the waters" of a new market or sector before entering as well as expand their concept and road map of products, SpaceMaker has decided to start the design and development of a new product that can be in charge of those two fronts.

After some initial meetings with the company and some ideas were evaluated it was also decided that the new product should also help incorporate new users into the SpaceMaker ecosystem. It should engage new users, and in case they live in areas where the core service is provided, it should serve as a gateway into all other services within the portfolio. This product will also be a probing mechanism to help answer the questions proposed in the problem statement section 1.3

## 3.5 Initial information

The objectives of the new product to develop are clear now:

- the realisation of the objectives of this project will help expand the SpaceMaker concept and service portfolio.
- the realisation of the objectives of this project will help guide the expansion of the core service into new markets or segments.
- the realisation of the objectives of this project will help engage new users and introduce them to the SpaceMaker ecosystem.
- the realisation of the objectives of this project is integrated into the system and feels like a SpaceMaker product, not as a separate service.

Now that this is defined, it is necessary to take a look into what the boundaries of this new product are. First, and most important boundary, is the user for which this product is intended. A second boundary comes with the context in which said user lives and will interact with the product.

According to a user and marketing research conducted by SpaceMaker, their services are better aimed at people who fit the following profile: Target users are both male and female, with ages ranging from 25 to 44 years old. They live in urban or suburban areas who live within a house that accommodates more than one person, usually family members. Most of them are nuclear families with three or more members. This means that the items within the house are usually shared within them. Their lack of space or in-house storage is not the main reason to consider remote storage solutions, but rather organization. Many of them already store things remotely in places like cottages or other storage providers.

The most common items for which they feel the need for extra storage space is usually seasonal clothing and collectibles, such as books or tableware.

Many of them not only store their items in remote places, but also complain that they are currently storing items belonging to other people that do not share a living with. Their main reason to not use self storage solutions or remote storage solutions have to do with service inconveniences. They feel these services are outside of their reach, both physical and virtual. They seem to be overwhelmed with the logistics involved in the service as a whole.

From this study, we can see that organization is a great concern for the SpaceMaker user, having a proper place for the items within their home. Keeping track of these items is important, as a big part of their pains come from storing items for other people. Ultimately, the new product is intended for people within the ages of 24 and 44 years old who are part of a family-oriented home or are starting a new one.

By combining these boundaries with the objectives, another user profile arises. Since the objective is to serve as a gateway into the SpaceMaker core service, students who are about to graduate from university, starting a career, and most likely are starting a family will be another set of main users.

## 3.6 The Organizing App

Grönroos et. al. [16] has defined what is called the service package model. Within this model, a company can look at its bundle of services as a combination of the core elements or core services with a set of enabling services and enhancing services.

With all this in mind, the project will aim at developing an on line mobile

tool or application that will assist its users into carrying out these organizational and sharing tasks, and enable the fulfilling the objective (figure 4.2). Taking this into consideration, the new service application should serve as both enabling and enhancing services for SpaceMaker, with the existing service as the center of it all.

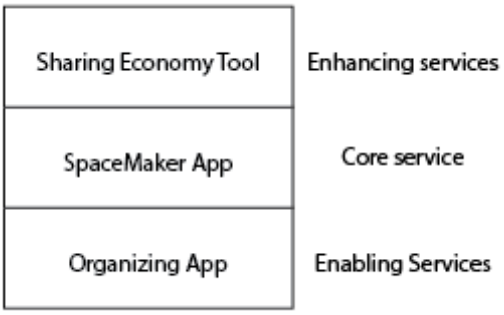


Figure 3.1: Service Package Model for SpaceMaker

As an additional objective to the afore mentioned ones, the new product should therefore aim at enhancing the experience as a whole within the SpaceMaker ecosystem, in order to make it a more marketable service.

In order to achieve this, a design strategy is necessary to keep a clear goal of what needs to be achieved, so the objective becomes a matter of finding a way to achieve a service system that is enabling to the core service and enhances it as it is being used.

Seeing how all these elements come into play, it was decided that what SpaceMaker needs is a service or product to help within the home of the users as well as with their belongings. These are the most important related issues to the SpaceMaker end user.

After deliberations, the form of the service took shape: an organizing app. A virtual tool to help users catalogue and organize their belongings, whether at home or at other places. The service will be available in the form of a smart phone application available for the same platforms as the core service already exists.

In order to achieve the enabling and enhancement, however, some design domains need to be taken into consideration. These domains will help bring the goals afloat as well and will be the pillars of the new service under construction; they will serve as a go to reference if at any point any design questions need to be answered without having user related or relevant data.

## 3.7 Design Domains

There are different strategies and design domains that can be implemented to achieve the general goals. However, after deliberations with the company it was decided that the most pertinent and effective ways to achieve the goals and objectives was to use the following set of domains:

- Behavioral change: this subject has been very debated and discussed over the years. It has become a sort of holy grail in several areas of study. Nevertheless, this plays a big part in the core service and therefore needs to be explored.

- Gamification: directly linked to the item above, gamification is playing a major role in the development of service applications in many different areas. It is necessary to dig into this and find what elements can be applied.

- Sharing economy: this domain is in the border between technology and real life. It is relevant to all the sustainability issues that the world is facing today. If SpaceMaker deals with belongings and possessions, it is pertinent that integration of sharing is evaluated for the development of the service.

In order to achieve this, the user experience needs to be re-thought. It is not a matter of setting an on-line market for the user to post her possessions. These types of markets already exist, but they do not serve the purpose set by SpaceMaker. Real user experience design goes beyond usability evaluations and deals with technology that fulfills more than just instrumental needs [22].

Instead, I propose a new service package model, which involves the existing services and expands them: There are two layers to the overall user experience: the personal and the interpersonal, and they deal with how much interaction with external stakeholders take place. This shouldn't suggest that the personal layer is an individual one. It deals with the personal belongings and sharing is done in a personal way, like lending things to a friend, sharing belongings with family members, storing possessions in different familiar locations, etc. The interpersonal, on the other hand, deals with the external stakeholders such as the remote storage on-demand (both personnel and place) and the interaction with other users within the system.

The storage on-demand service has already been implemented by SpaceMaker and the Organizing/cataloguing of belongings is somewhat addressed with this service but, it is not yet completed as it is not the primary feature on the existing app. The sharing/trading service has not been implemented.

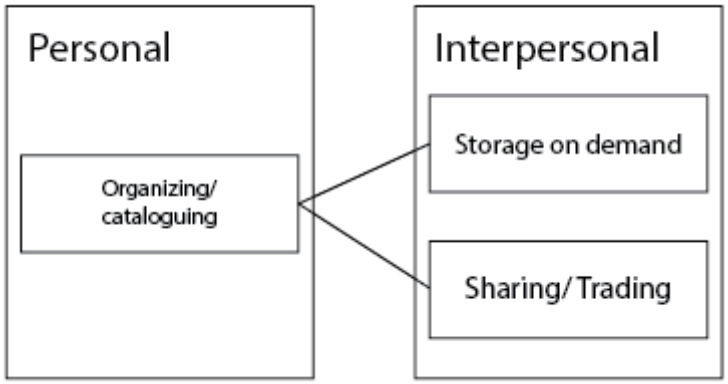


Figure 3.2: User experience layers within the system

## 3.8 Existing Solutions

As expected in the field of innovation and entrepreneurship, solutions to the problem proposed are already available in the market. With very intricate and very beautiful designs, these solutions all introduce different features that differentiate them from each other.

This should not discourage the design process at all. Just because a solution to a problem has already been implemented, doesn't mean that a better one can not be developed. Therefore, analyzing the different strengths and weaknesses of these existing solutions is key to understand what it is that SpaceMaker should aim for, and more importantly, HOW it should be done (or not be done, in some cases). Using this list of implementations should act as a compass and shine a light toward the direction which to take.

After going through the list, a question arose: Can SpaceMaker design and develop an IT application that will try to solve the problems of its users, given the aforementioned domains, in a better way than the already existing ones? In other words, can SpaceMaker provide its users with a more optimal solution than the already existing ones?

# Chapter 4

# Empirical Study

The idea of creating a new service within the SpaceMaker ecosystem generated many questions to start out with. Many of these questions were answered by the already existing design portfolio provided, as well as their extensive research and profiling of their target users. However, because this is a case of user experience design, naturally the design process needs to be user-centric.

Some ideas are already in place to start developing these extra services. However, as denoted by Baroudi et al. [4] the involvement of the user in the design process is crucial for increasing user satisfaction and usage.

As described by Hevner et. al.[23] this is a project in the design science domain. In his "DESIGN SCIENCE IN INFORMATION SYSTEMS RESEARCH" article, Hevner describes several guidelines within the framework that are of importance when dealing with design science. However, given the scope of this project, only the first half of Hevner's framework will be applied.

As we can see, the left side of the process is business driven and user-centric. In the center of it all, we can see that the purpose of Design Science within Information Systems is to develop theories and use these theories to produce an artifact. This artifact will be then, the new product for the SpaceMaker ecosystem.

With help of the predefined work done by SpaceMaker and its related partners, the organizations and the technology have been described (as shown in the introduction) and the profiles of the people have been specified.

In order to carry out this project, the guidelines that are going to be used are the following:

- Design as an artifact
- Problem relevance

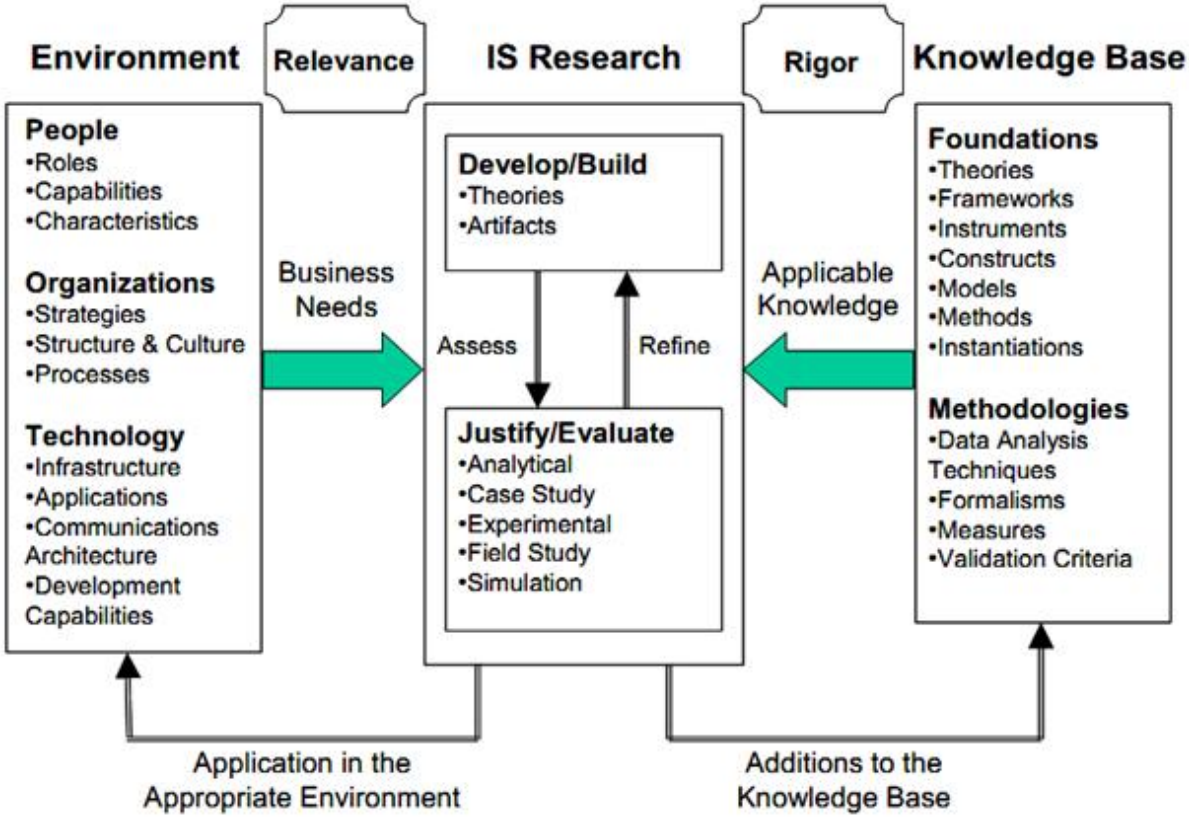


Figure 4.1: Information System Research Framework [23]

- Communication of research
- Design as a search process

All the other guidelines are outside of the scope and therefore are not taken into consideration. The guideline regarding evaluation will be partially used, as it will be mentioned in the "Future work" section.

Therefore, the purpose of this empirical study is not to provide new theories, models or techniques to the scientific community but rather apply the already existing ones into creating an Information Technology artifact that is relevant to the stakeholders: useful and helpful to the SpaceMaker user group and makes business sense to the SpaceMaker company.

## 4.1 Proposed Solution

As mentioned before, in order to reach the objectives, a mobile application will be created to create incentives for the users engagement in the matter and help reach the goal.

I propose the following empirical method, in order to reach a service design that complies with Kuniavsky's definition of 'success for the end user' (functionality, efficiency and desirability) [28].

I start by proposing a design of a tool that will help guide users into the sharing economy by tapping into their possessions and exposing them through methods of organization and cataloguing.

One major trigger for participating in the sharing economy is that of divesting [15]. When a user sees that she has more stuff than she needs/wants, a process of transfer of ownership of the possessions take place. This tool will then act as a trigger for the user's behaviors, as stated in figure 2.1.

The objective of the service to be designed should then tackle different problems that people face when organizing, storing and/or sharing their belongings, mainly moving from an intention to real action:

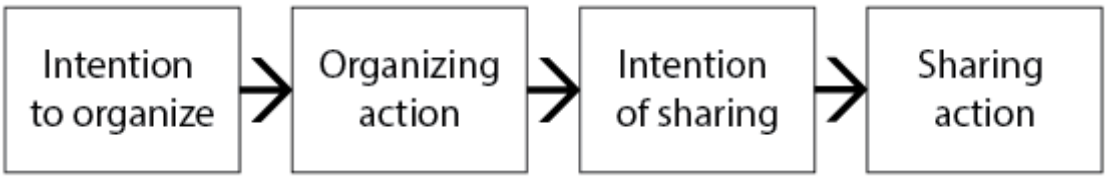


Figure 4.2: objectives of the new service

Hopefully, the service not only motivates the user to go from intention to action, but it should also make her aware that there are things that can be shared, thus completing the user journey.

## 4.2 Finding the Users

If this was to be a user-centric project, it goes without saying that probably the most important stakeholders are the users. Following the guidelines set by the company in their studies (extensive market research), a set of user personas were established that would act as a muster for the target audience needed for the study.

Several people who fit the persona profiles were contacted and engaged. They agreed to voluntarily take part of the study and provide insights and

feedback on the different stages of the process. They also agreed to carry out the interviews in their homes, so contextual observations can be made. Five users were interviewed and analyzed.

No incentives or rewards were given to them, but this did not seem to pose a problem for the study.

## 4.3 Benchmarking

Once the users were identified and contacted, it was important to see what other options were already available in the market that were intended for the same objective. SpaceMaker had already done an extensive research on existing competitors, as part of their marketing strategies. These solutions were mostly aimed at storing objects, and some were added that dealt with, not only storing, but also cataloguing and sharing.

| Name of solution | Main Characteristics |
|---|---|
| Boxes (iOS) | Organize your things by boxes. Offers market place for boxes you want to sell |
| ClosetPlus (iOS and Web) | Catalogue items within your closet. Helps you create outfits with the items added |
| Home Inventory (iOS, Android) | Build an inventory of items at home with attention to its details |
| NeighborGoods (Web) | peer-2-peer lending and renting. No cataloguing |
| NestEgg (iOS) | Home inventory and cataloguing. Add items using a barcode scanner |
| RentyThing (web) | Catalogue stuff at home and create a business out of it by renting or selling. Easy access to marke |
| Snupps (iOS) | Catalogue collectibles. Focus on communities of collectors |
| Sortly (iOS, Android) | Easily catalogue and search for items. Slick and simplistic graphic design |
| StreetBank (Web) | Peer-2-peer lending and renting. Connects you with neighbors specifically |
| Visual Home Inventory (Android) | Catalogue items with attention to details. Geolocation is available for tracking |

Table 4.1: Existing solutions to the proposed problem

This shouldn't suggest that the problem has been solved. What this served as, was as a starting point on which to base future assumptions for

the design. With already existing solutions in mind, different information architectures and user experiences could be analyzed and compared, in order to strengthen the design.

As mentioned earlier, this process requires a user-centric approach as described by Donald Norman in his book *"The design of everyday things"*. In it, Norman describes it as an iterative process in four stages.

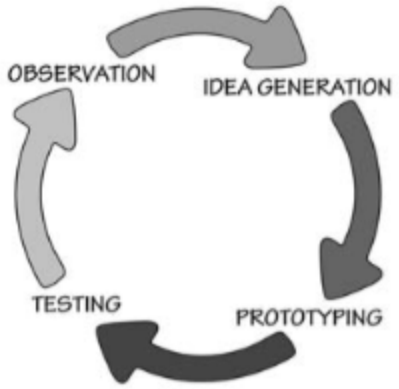


Figure 4.3: The iterative cycle of human-centered design.[33]

## 4.4 The Iterative Process

Due to the restrictions on the project on time and resources, the iteration process was designed to be carried out in three iterations, all of them keeping the user as the base for all designs and analysis.

In the first one, the users were approached to do an initial overview of the problem and analyze causes. The objective was to tap into the feelings attached to organization at home. This was going to be done without the use or help of technology in order to keep it as unbiased as possible.

Some of the main questions that needed to be answered were: What are the users needs and wants when organizing stuff at home? What are their behaviors and pains? How do they map their home and the things within it? What affects their willingness to share their things?

These are some of the questions that should get clarified during this interview and from here, the most important features and characteristics of the service should emerge. At the end of this first stage, an initial wire frame prototype [35] was designed. This was a very early solution and tried to

tackle the problem immediately, by applying the main concerns as features within the design. The objective of this prototype was not to test on users, but rather to start making sense of how these features should work together and how the application should flow.

The second stage of the process dealt with how to introduce technology into the users' lives in order to help alleviate the pains and fulfill the objectives proposed after the first stage.

At this point, no concrete IT solution had been designed nor prototyped. The concepts were still being explored. Rather than reaching out to the users with the initial prototype, it was necessary to understand better the meaning of the functions that were found relevant to the user and what routes could be more interesting to take in terms of information architecture. Here is when the benchmarking process was important. Out of the list, three solutions were chosen to make the second round of interviews based on the established criteria.

In order for a solution to be considered, at least two of these had to be met. The selected solutions were then taken to the users and tested with the objective of finding out main problems and reactions to the interesting design and/or features. Observations were made towards their behavior with each of the tools. The objective was not to carry out a user evaluation of these applications but rather find directives on features and user paths necessary to create a better experience.

Donald Norman says that our roles as design researchers differs from the scientific ones. Where science focuses on natural laws, design research focuses on potential customer needs and problems [34]. In order to do this, a questionnaire was written with the intention to probe into the user's lives and their behaviors towards the set problem [37]. For the first round of iteration, the questionnaire mentions no technology at all. It focuses on the user's mental maps of their surroundings and specifically their homes. These questions were asked to each of the selected users in their homes, where they could interact with the surroundings. Their answers were recorded as audio files and later transcribed as text. Notes were taken on their reactions and expressions during the interviews. The following is a list of the questions used during the two rounds of interviews. A few lines of introduction and conclusion to each session were also used, but are not noted below.

### 4.4.1 Round 1 Questionnaire

Let's start by talking about your home. The place you live in right now and the people who inhabit it.

- How many people live in your home?
- If more than one: how is the living situation? Do you live independently under one roof, or do you share spaces?
- What are the shared spaces? Do you have private areas?
- Close your eyes and describe to me your home, how is it constituted?(note them for question 7)
- If you were to have company, where would you host them? Say, a movie night, or a get together.
- Which places would you never take visitors in? Why?
- Do you have an "extended home", i.e. places outside this house, that you would consider part of your home? For example, a summer cottage, a back yard, etc. If so, can you describe them to me?

Now let's talk about your belongings. We usually tend to collect things. Not necessarily collectibles per-se, but we gather things, like clothes, books, cards, etc.

- Can you tell me the most important collections in your home?
- What would you say is your most important collection? some things you care for.
- Where in your home do you keep them?
- Can you show it to me?
- Out of these (collection items), which one is your most favourite or most valuable?
- Can you show these to me?
- Let's go through the places in your home you described earlier, and I want you to tell me for each one, if you would show a visitor your belongings that are within that site and how valuable are they to you.

Finally, let's talk about organization and sharing within your home.

- Do you believe things in your home have a "proper place"?
- How do you guys deal with organizing things at home.

- Who does the organizing, how do you manage this task?
- Have you encountered problems when sharing this task?
- How often do you organise things at home. Meaning, going around, putting things in their proper place.
- Do you think it is enough? Would you like to do it more?
- If so, why don't you do it more often?
- Have you ever had to move to a new home? If so, can you describe briefly how you handled the situation and if you encountered any problems?
- How do you find an item that you can't recall where it is?
- Regarding your home, your belongings and organization, is there anything you would like to add or say?

As you can see, these questions were designed to make sense of the user's mental maps. How do they perceive their homes and their surroundings? How do they recall an object's location? What role does privacy play around the house? and how important is organization and control over their possession? These are the basic themes that will be explored in the results section.

### 4.4.2 Round 2 Questionnaire

Thank you for your help. This time we have brought 3 tools that are aimed at helping you with organizing your belongings at home. I will introduce each one, and I want you to use them and tell me your opinion on them. I will give you some tasks, and then I would like you to think aloud as you are completing them.

First is SORTLY APP. This app is focused on cataloguing your possessions. I want you to open the application and tell me what you see and how you think it works.

- What do you think about it right now?
- As you can see, there are several places to store your things within the app. What I want you to do right now is to take ONE item in your home right now and catalogue it using the app, in other words, add one item to the system.

- Now, I would like you to move that item to another location.
- Last, open the item and look at the details that you can attach to it. What do you think of these? are they useful? Are they relevant for the item you catalogued?

Now let's move to Nest Egg. This application also helps you catalogue things using a bar code scanner.

- Again, open the app and tell me what you see and what you think, maybe compared to the previous tool.
- Can you catalogue one item by scanning it's bar code?
- What do you think of this feature?

Finally, there is LIVIBLE LABELS. These guys are more focused on the organizing part. They are introducing QR codes (show the printed QR codes) which you can print out and put on boxes, or places where you have things, and then you can access the information of these places by scanning the QR code.

- Open the app and tell me what you think.
- Now, let's pretend you are using this app, and you can use this QR code to create a storing place. Could you try to do that using this app?
- What do you think of the QR codes?

## 4.5 The Third Iteration

The last iteration was special. Due to the scope of the project and the limits on resources, a third iteration was proposed, that focused mainly in the design of a first version of the new application.

Taking the results and analysis from the first two iterations, it would be now possible to start creating a higher level prototype. For this, the design briefs presented by the company in the beginning were fundamental. The idea of this iteration was to accommodate the results to an already existing schema of the company to comply with the objectives set in the beginning for this new service. Graphic design played a major part in this stage and some implementation into a working prototype began.

As you can see, testing was not carried out in every iteration because not every one of them produced a prototype that was ready for the user. Instead, the first step of each iteration became the testing for the prior, as the users were always involved.

Although this round of interviews had tasks assigned to the users, the main purpose of this questions is not to evaluate the efficacy of the apps, but rather get a reaction to the most important features found during the first round. Therefore, this interview is more unstructured and more open ended for the user. Special attention was payed to their body language and expressions.

## 4.6 Design Restrictions

For a deeper understanding of the findings and decision taken it is important to look closely at the restrictions that were set by the company initially.

As mentioned earlier, this design project is to be done on top of an already existing service platform that is ready to launch. Therefore, there are specific parameters that have to be followed and certain restrictions that should not be broken in order to keep consistency and connectivity between the different products developed.

The first and most important restriction is the users for which it was going to be designed. The SpaceMaker company has provided an extensive research on their potential customers and users, using surveys through hundreds of people in several countries. With this information, the company has managed to put together a user profile that is clear and concise which has been the main focus of all their designs.

A good way of displaying this information is through user personas. Many authors have written about these and the different ways of boiling the information down to the user profiles or personas. Miaskiewicz and Kozar [32] have made a thorough research on all the benefits that using the technique of user personas on the human-centric design process.

The next design restriction set by the company is that the product needs to be aimed at mobile devices. The possibility of the new services within the SpaceMaker package to be set in other contexts is also available, it is not a strain jacket. However, due to the great influence that mobile technologies have been posing over most of the first world countries, it is evident that this is the area that needs to be explored at the moment.

Also, the act of organizing things around the house means that the user need to be moving around. Focusing such a project in a non-mobile platform (be it a mobile smartphone or a wearable of some kind) would mean that the

pains of the user in terms of organizing would be increased, and the company would then not be solving any problem.

This mobile approach also means that it needs to be a cloud-based service. In other words, the tool should run in the user's mobile phone as a native application - and not as a web application - and it should connect via cloud services with the SpaceMaker servers. This way, the company can provide a more integral service for the user. Because the user's data is being stored in a remote location, she needs not worry about migrating her data once she has decided to change her mobile phone, or start using a new one. This means however, that al users will need some registration and authentication against the SpaceMaker system. Some users can find this to be unacceptable and can be a decisive element for some of them. However, the amount of pros is much higher compared to the cons when it comes to building a cloud based service.

For the company side of the design, it is also better to keep a cloud-based service. This is an easier way to reach customers and have a constant feed on their actions and behaviors, thus making way to new user services to be provided within the same system.

As noted earlier, SpaceMaker has already designed, built and implemented a product. Another web-based application that deals with self storage as a service. In order to do this, they teamed up with the company Idean and came up with a final design. This represents the strictest restrictions, without that implying that they are impeding the design process.

Since a lot of time has already been spent in graphic design and user flows, it is only fitting that all new services and products within the system carry the same designs and flows in order to establish consistency within the whole service package.

Up next, I will be showcasing several screen shots of the user experience of the existing product. These come from a working prototype running in a mobile phone:

The user experience within this app starts is based around the home view. According to the Idean design portfolio, this view represents the two main areas within the service: home and remote storage. This is the most important places for the user, therefore they are the main tabs at the top of the screen. We see central big numbers to catch the attention of the user right away, and right next to the big number at the home screen, we get the call-to-action buttons which will lead the user through the purchase and other services of the platform.

Underneath the main call-to-actions, a list of the user's boxes is displayed. These are secondary to the service from the point of view of the company. However, they are of high importance for the user and therefore are accessible

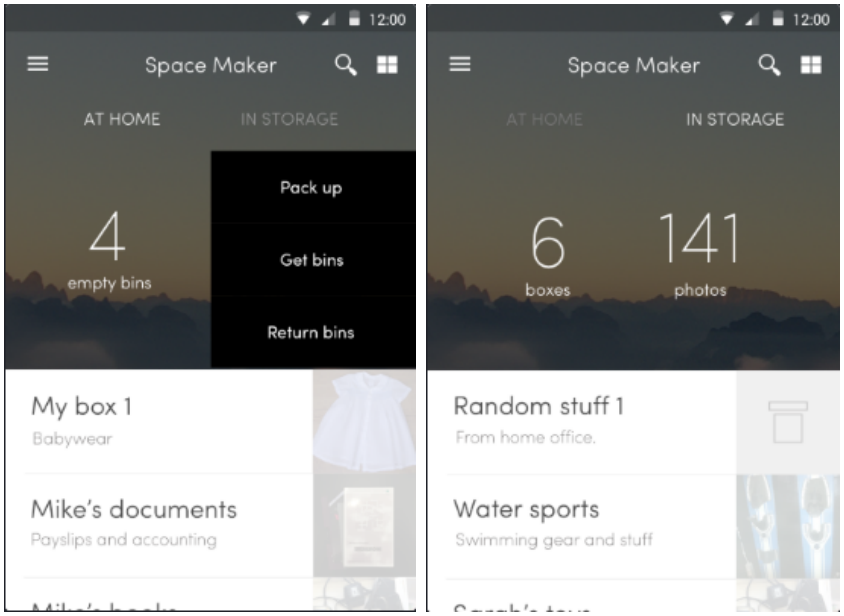


Figure 4.4: Home screen of the SpaceMaker App

from the very beginning of the user journey. Important to note is that the boxes the user has at home and at the remote storage are probably different and displayed respectively. When the user wants to see the details - contents- of one specific box or one specific item, she taps on the desired one and the next screen appears:

In the left image we see the details of a box and its contents. Every box has a cover photo which should act as a quick reminder for the user of what the contents are. In the right we can see the detail view of items. These consist of enlarged photo of the item with a name and a small description. The most important part of the item is the picture.

The user can edit any of the details displayed and can add new items, remove items or move as she sees fit.

When the user taps on any of the call-to-action buttons available at the home screens, one of these views will appear. As we can see, the design is quite different, with vibrant colors and steps to be filled. This was done so that the user is not confused and knows that she is in a process to engage with the platform, not a review. All call to action buttons follow similar patters with important aspects highlighted with the fuchsia color.

The most important part to note at the moment are the big differences between the home screens and details view of the different things in the system with the user interactions upon call-to-action buttons.

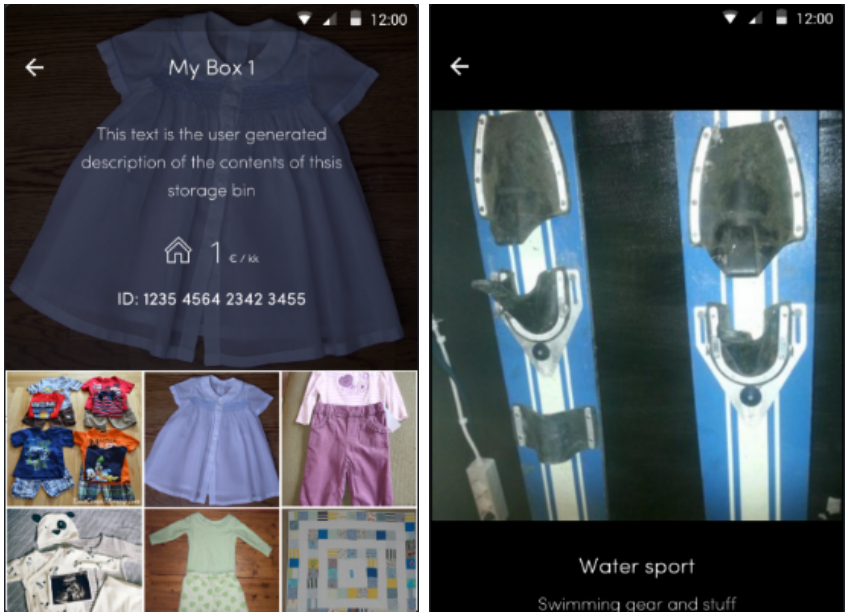


Figure 4.5: detail screens for box (container) and Items

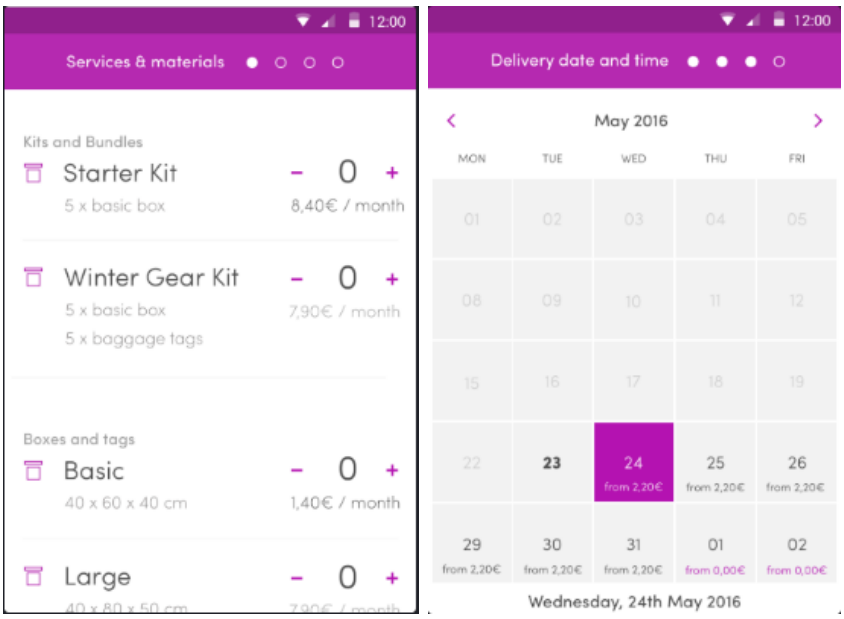


Figure 4.6: call to action responses.

# Chapter 5

# Results and Discussion

In order to better understand the process, the flow of ideas and the decisions taken, it is better to look at the results in the chronological order at which they happened. The process was user-centric and therefore it was result driven, meaning that every action that was being taken, had to do in one way or another due to the feedback given by the users or some meta-data extracted from their information.

## 5.1 User Personas

With the information gathered by the company in section 4.6, as well as the company marketing research and information, it is now possible to describe the SpaceMaker user with the next user personas:

According to the SpaceMaker market research, their users are mostly within the ages of 25 to 54 years old and mostly within a relationship (couple) as shown in figure 5.1.

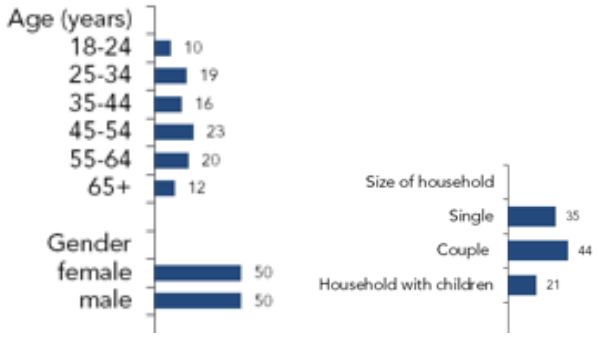


Figure 5.1: SpaceMaker usergroups by age and family status

The research also shows that these age groups have a strong need for extra space within their homes, or at least they have a perception of the problem:

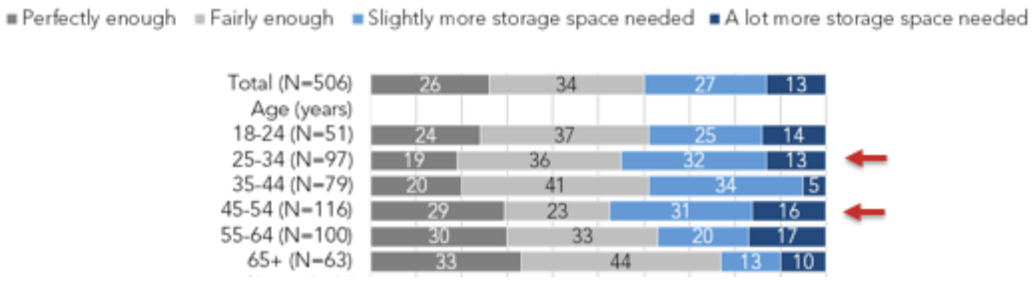


Figure 5.2: Survey question: When you think about your home, do you have enough storage space?

A very important thing to notice from the market research is that the need for storage (lack of storage space at home) is not the only reason to consider the SpaceMaker services:

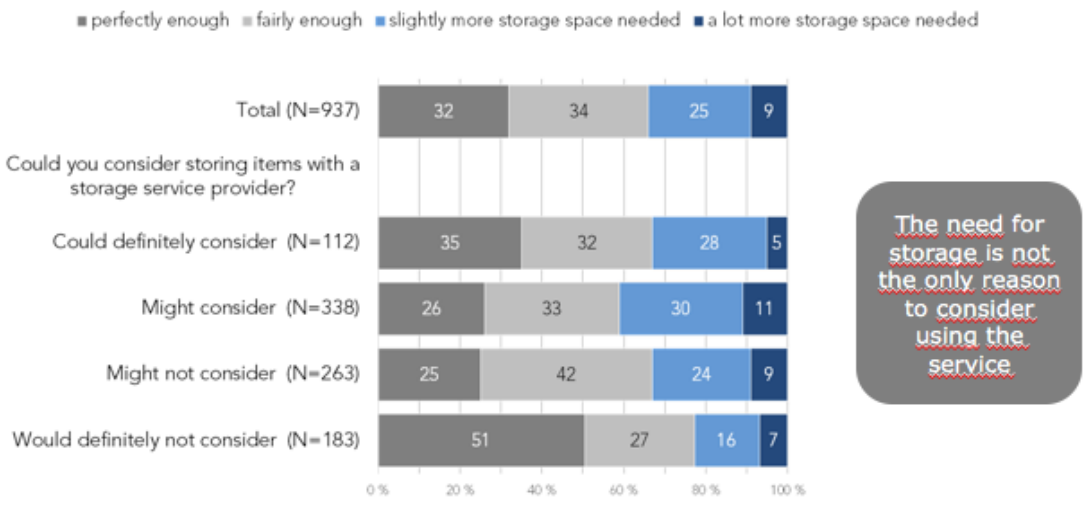


Figure 5.3: Survey question: Could you consider storing items with a storage service provider?

This is important, as we see that for the user, the problem is perceived, not necessarily evident. This suggests that the problem is more in the user's head, than in the real world. Therefore, managing these problems inside the head would be a better initial solution and hence, the Organizing App to help with this.

Name: Jane Doe
Age: 50
Nationality: Finnish
Residency: Helsinki

Details: Jane Doe is a married woman in the Helsinki area. She shares her home with her husband of 25 years and together they raised 2 kids. One son and one daughter. The oldest son is finishing his studies at the University of Helsinki and spends most of his time at the university library studying during the week. The youngest sibling, the daughter, lives abroad while she completes her Erasmus year for college. They all live in a fairly big house in the outskirts of Helsinki. Jane shares a bedroom with her husband and each of the kids have a room of their own. They live in a 2-story house so they have enough living areas as well as bedroom space. The family also has a backyard where they carry out activities with friends and other family members. Jane works part-time as a consultant and she spends most of her free time busy with different hobbies and sports. Her husband works during the weekdays and is usually too tired during the weekend to take on a sport or other time consuming hobbies. He prefers resting and eventually going out for a light run. They both have been considering what to do regarding their living situation due to the fact that the kids will soon be done with studies and will move out of the house. Sometimes Jane thinks the house is too big for her, but sometimes she thinks she can use the extra space for all the special interests she now has. Both Jane and her husband are extremely organized people and have a tendency to organize their home very often.

Name: John Smith
Age: 35
Nationality: German
Residency: Dusseldorf

Details: John is a 35-year-old man who has been married for a few years with his wife. Together they have one child of 5 years. Until recently they had been living in Berlin, but because of family reasons as well as work, they have decided to move to a suburb of Dusseldorf where they live in a medium-size apartment. One bedroom for the couple and one bedroom for the child. They have an open kitchen in the living room which in time acts as an entertainment room and dining room. They are recently moving into this new apartment and they are still trying to figure out where to put all their things around the house. Since they are moving into a new apartment, they have brought not only the things they had in their old home, but also some things that each one still had at their parents houses that they had not been able to before. They want to sort things out and see what they can get rid of. John's idea is that there is no better time to start getting

rid of things and getting new things than while moving. However, they are having a difficult time since they just moved in. Settling down and getting all things done is difficult. John is worried that he can see already a lot of organizing getting postponed by pushing boxes and more boxes of things down to the basement. He knows that if they don't go through these things together soon, they will just pile up, and the work in a few years' time is going to be even more problematic.

## 5.2 Initial Approach

Before getting started with user involvement it was very important for me to dig into the SpaceMaker ecosystem and understand it's core components and services and the different interactions that the user is confronted with. By dissecting it, it would be easier to start seeing what is really important, what should be kept for future services and what parts could possibly be dropped. Let's recall what the service does at the moment with a simple summary.

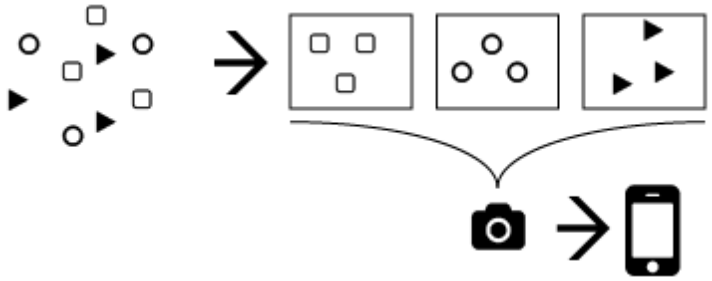

Figure 5.4: Conceptual model of the core service.

The user has a need for freeing up space at her home. She wants to send some of her things to a remote storage facility. At this point, the motives of her need are irrelevant to the service.

The user then opens the up, logs in and orders the boxes she deems necessary to pack all the things she has. The application lets her choose a location for delivery and a payment method.

Within the established time, the boxes arrive at her home and she can start packing. She can take photographic evidence of the things that go in each box, which at the same time, are coded for future reference. She can be as detailed with the pictures as possible.

Once she is satisfied with the way things are packed, she orders a pick up, following a similar procedure for ordering boxes, and within the established

time, the boxes are picked up and taken for remote storage. what happens with the boxes after they are picked up, is not up to the user to observe or control. Later in the future, the user can recall any or all the boxes she has stored by requesting this service from the application.

As we can see, the service involves both the digital and the virtual world. Things are scattered around the user's location and in order to input them into the system she needs to take pictures of them.

This sorting is done manually by the user, following her rules and methods. There is no assistance given to the user on the process of sorting elements.

All the real boxes are branded with a QR code which is used to create it's digital counterparts as well as easy access in the future. The items and the boxes reside in the digital and real world and it is a challenge for the service to keep these two worlds synced.

With this in mind, the user now is given a simple structure of the places that are relevant to her items: her home and the remote storage facility.

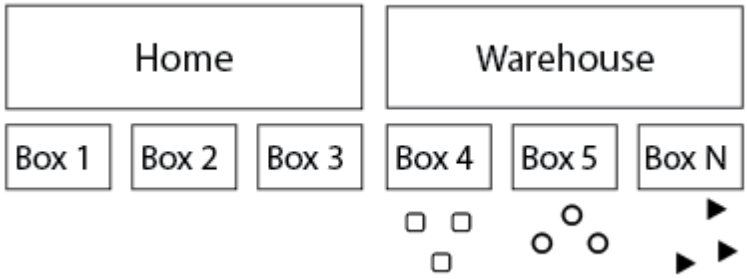


Figure 5.5: Over all structure of the service.

SpaceMaker focuses on dividing the user's possessions with boxes or containers and therefore, both the user's home and her stuff at the remote storage is divided by them. There is no other structure or hierarchy within this information.

As mentioned before, the initial assumption is that people need to be aware of the amount of things they have in order to realize that they could engage in the sharing economy system. Therefore, if a new service was going to be designed to get users into that area, it would be necessary to focus on the belongings of the user and her home. How she organizes things around the house and how the user creates mental maps and structures for the task. My initial proposition was then, to focus on the left side of figure 5.4. How to help the user make sense of the chaos around her house. How to aid in

the construction of these mental maps and possibly add new layers to the structure:

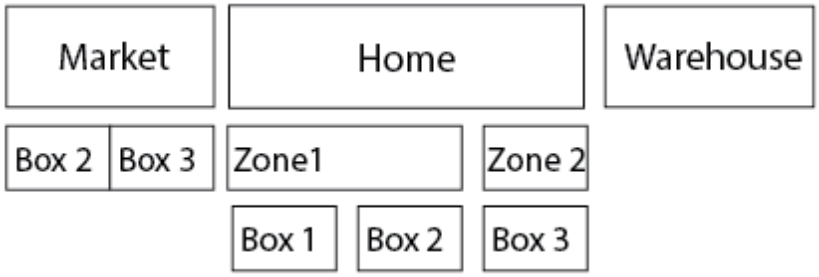


Figure 5.6: Proposed structure for the new service.

From figure 5.6, we see that the warehouse is now a secondary matter. It is completely out of the focus of the project. The central part is the home, and it is here where new layers are added and where the user concentration should be. A new site is added: the marketplace. My proposal is that the user will be organizing things around the house and structuring it, while at the same time sharing the items within this market and thus engaging in the sharing economy. All this should build on the user experience design, as proposed in section 2.1.

However, these new layers and hierarchies are still in the virtual world and there was a necessity to map it to the real world. Just as the existing application uses printed labels on the boxes, something similar was needed for tracking.

Immediately, the first idea was to use printable QR codes in order to manually label the boxes in which the user is organizing.

With these structure defined, it was now time to propose an initial user flow or user journeys within the service. The main streams were proposed as follows:

- Organize/Store within home: Though this might sound redundant, it is the main reason for this service. Storing things at home, while organizing is what is going to get users engaged. This flow deals with creating the different layers within the structure. The idea behind this is to get the users moving around their homes and encouraging to actually dig through things at every corner of the house.

- Print-out codes: In order to map correctly the virtual world with the physical world. This could be also used as promotion services for the

system and as a hook to engage new customers. It would also provide a better way to physically catalogue the different storage areas around the house.

- Browse through articles: The idea of organizing things at home is then to give the users an overview of their belongings at any point during their day. There has to be an efficient way for the user to browse through her items and find something specific that she might need, or in which she is interested. This also suggests that there needs to be an incentive for the user to review her items. Can we get the user to review over and over again her things and find patterns or characteristics within them that will help facilitate the engagement, both in the sharing economy and the other products within the package?

- Handle account: As it is a cloud-based service, there needs to be a user account linked to all the data from the user. Therefore, a user journey for handling her information and account data is crucial, because it is in these areas that the user understands that she is part of a bigger deal. That this is not simply a local database of things and pictures, but rather a method for changing some of her ways and enhancing others.

With all this in mind I set up to create an initial prototype. The purpose of this one is not to create something for the users to see and interact with, but rather to help clarify details about the initial assumptions. Since the design process is being done independently, in a one-man team, and there is no available discussion with other interaction designers, having a wire frame low-level prototype gives a lot of insight on what parts of the propositions are usable or effective and which parts are the ones that need to be further explored with the users.

For this level of prototyping, sketching and paper prototyping are usually the most effective ways. These methods are quick to develop and gives out great insights and answers in an almost immediate fashion. However, I decided to use a digital prototyping tool called Balsamiq [1]. This tool produces sketch-like prototypes that give an air of paper prototyping with the benefits that it is all digital. They use a vast library of predefined objects and elements which can be easily dragged and dropped in order to create the prototype. This tool proved to be quicker than paper prototyping and much more effective. It was not necessary to cut and paste physical papers around. The user flows and navigation are very easy to create using hyperlinks within the digital sketches. The results are as follows:

[1] `https://balsamiq.com/` accessed on August 28, 2016


Figure 5.7: Initial prototype. Starting menu. Main parts of the information architecture (section 2.1)

The idea for a main menu started with the user personas. After studying these potential users, it was important that the design was oriented towards people who are not particularly tech savvy. Therefore, it was important that the main user flows, the main navigation was available at the beginning for the user. These actions are represented by big buttons that occupy the whole screen. These buttons are complimented with icons for easy recognition and to make it easier for recurring users. This view should give the user a complete overview of the system, what she can do and provide easy access to the actions. This is shown in figure 5.7

Figure 5.8 depicts the home view of the prototype. The objective was to explore how to display the information regarding home and the boxes within it. The idea here was that from the moment you enter you can see some of the boxes the user has and also have the opportunity to create new boxes or access the contents of a box by scanning the QR code attached to it. At

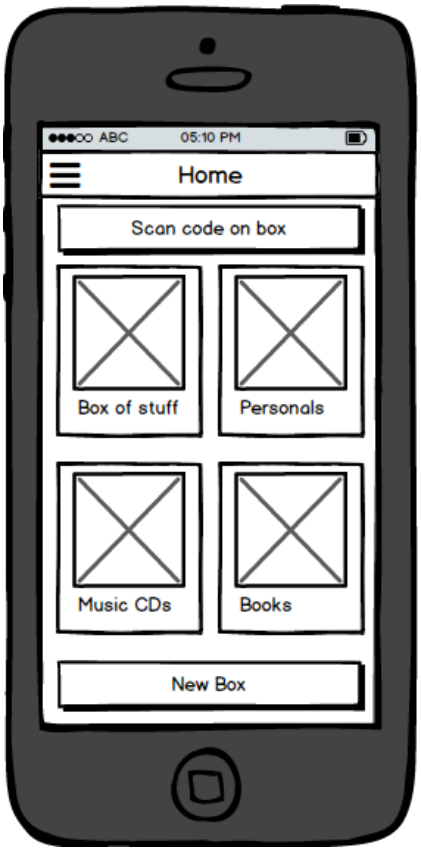


Figure 5.8: Home view of initial prototype.

this point, the zones were undetermined and boxes represented areas in the house. A user could thus treat a closet as a box, or a drawer as a box.

At this point the design does not resemble much the one proposed by Idean. I was starting to explore new possibilities.

The next flow was the creating of new QR codes for the boxes. The initial idea was that upon creating an account, the user would receive a determined number of QR codes to print out and distribute throughout the boxes and storage spaces around the house.

After the user has exhausted all her initial codes, she could use the main menu for creating new codes. This process is shown in figure 5.9. This could be used by the company as a new revenue stream, depending on how successful and useful the QR codes proved to be.

Since it was printed by the user, she would need to ensure that the codes were successfully attached to the boxes. Either by printing them in adhesive paper or by using any means necessary to ensure that it would not fall off.

This presented an immediate problem, as adding yet another physical layer to the flow implied more parts on which the system could fail. The code is not correctly printed, the ink faints due to water or moisture, the code is ripped or bent by tear, etc. This idea, although tempting, started off looking very inconvenient for the user.

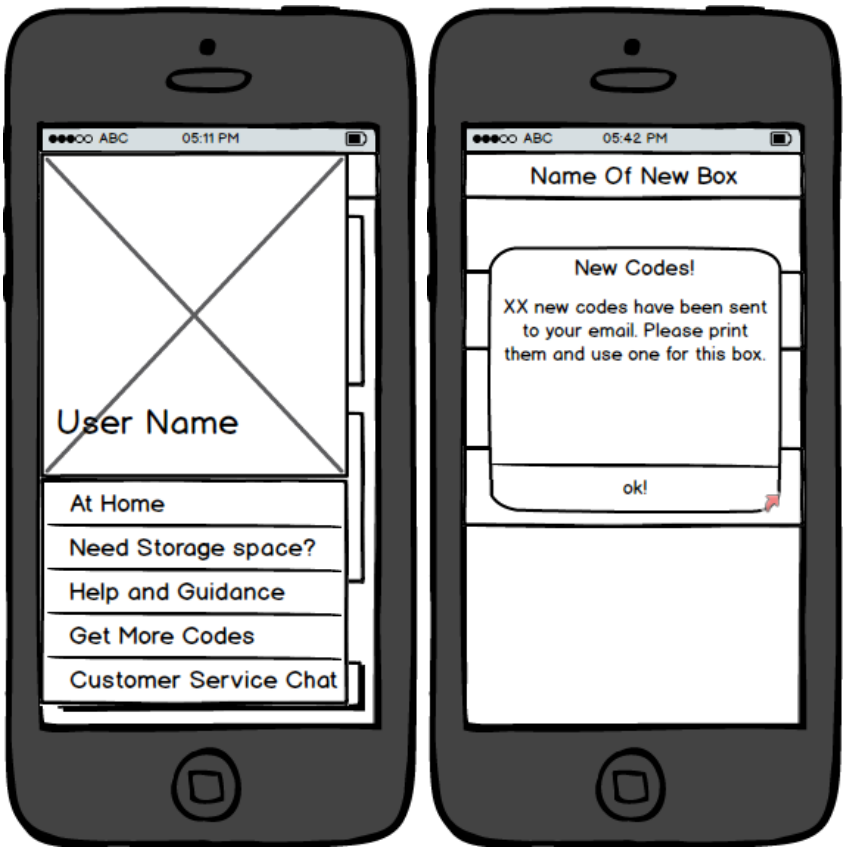


Figure 5.9: Process to order new QR codes.

Not only is the process creating extra steps for the user in the real world, but also meant that the user needed to receive these codes in an email or some sort of digital package to print out. This means that the system would increase in complexity.

Once a user taps on one of the boxes/container cards in the home menu, a new view appears that shows the contents of the box. A small review including the name and other details of the container appear at the top, as shown in figure 5.10.

Each of the items within are represented by an image and some tags. The idea was that every item has several tags for easy reference in the future, while

browsing through all items.

The idea of this view is to keep a consistency with the home view. So the user gets the idea of the structure, that within her home she has boxes or containers and within containers she has items.

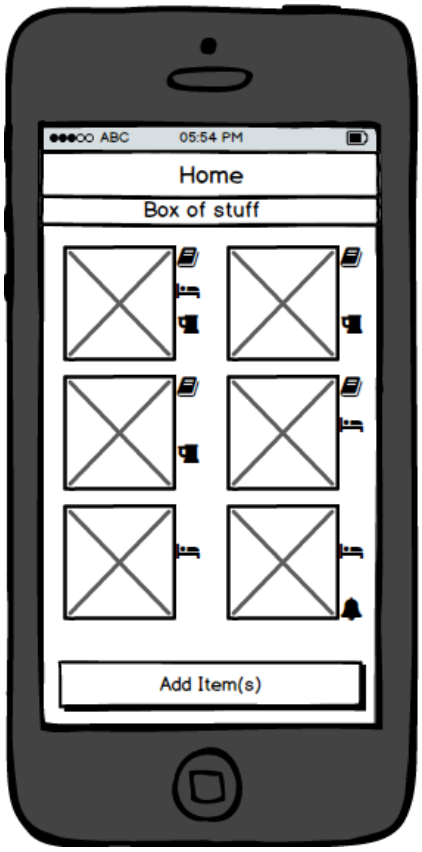


Figure 5.10: Browsing of items within a box or container.

These are the main views within the initial prototype. As stated before, the objective was not to jump into the design stage, but get a few initial problems that could guide what the initial interviews with the users should focus on. Some of the conclusions and questions I managed to gather from this process are:

- Is the structure of the system simple enough for the user? In other words, am I creating too many extra steps for the user that will make the organizing task even more difficult than it already is?
- Is adding QR codes for box reference a good idea? Is it something the users want to have as part of their organization rituals? Is this a good complexity level for the users?

- What happens with the items that user wants to add, that are not within a specific box or container, a.k.a. orphan items?
- Should items be represented by images? How do users recall items? Are tags a way to ease this process?

For all these reasons, I decided to focus the first round of interviews in mental maps of the users as well as their organizing approaches around their homes.

## 5.3 Initial Interviews and Data Analysis

Parallel to the process of initial designs, five potential users were contacted and asked to participate in the interview sessions that would help better understand their needs and wants. These users were chosen to fit the user personas (section 5.1) as close as possible.

As explained in the empirical study section, the interviews were designed to be in a structured format with some defined questions regarding the main concepts for the new service. They were to be carried out in the interviewees homes or in a place where they felt comfortable. Not within an office space or laboratory.

The main change in this part is that, even though the interviews were structured, and the questions were set from the beginning, as the interview carried on, every user had specific things they wanted to talk about, different remarks. These turned out to be very interesting and helpful and therefore most of the interviews shifted towards a more unstructured interview. The main themes were kept and the questions were used more as a guideline rather than as constraints. The idea was to make it more into a conversation in order to achieve better user involvement and better insights from their answers.

The interviews lasted around one hour with each user, and these were carried out with pairs at a time. Since the user personas described couples living together, interviews usually involved a couple, not an individual.

The interviews were also recorded in a digital format and notes were taken regarding the different situation. This produced a vast amount of qualitative data that was ready to be analyzed. Almost all questions were kept in an open-question format, because the idea was to get get the users feelings regarding the subject, therefore quantitative data would not have helped.

In order to analyze the data, several steps were taken, following Taylor-Powell and Renner's methodology [36]. According to this, the first thing to set was what the most important questions to be answered were.

These main questions were defined as the main topics or main themes of this round of interviews. They were:

- The user's home and boundaries. What does the user consider to be his home, and how does she mentally visualize it? How does privacy help create these maps?
- The user's belongings at home. How does the user create categories for her things? How does she recall where things belong to and where things are? Is there an order for things?
- The user's organization rituals. Does organizing happen among everyone in the house? What triggers organization? How do the users react towards organization? Does this process need help?

This is how the questions were designed and planned, and how the interviews were supposed to flow. Start with the user's home, make way into the belongings and then talk about the relationships between belongings and home. The narrative data acquired from this process would then be used to confirm or reject the initial assumptions and hopefully suggest new topics of interest on which the design should focus.

Following the methodology, once the interviews were made they had to be transcribed into text format. This way the data can be analyzed more thoroughly. A process of physical cutting and and moving things around took place. The transcriptions were divided into the main themes set up at the beginning in order to start extracting some categories out of the user's answers. The use of highlighters and post its was important. This way the categories were color coded and soon you could start seeing patterns emerge in the data.

For each of the themes of the interview, several categories were identified for further analysis. They are presented in table 5.1.

Because the last theme is a combination between the first two it is evident that there are some connections in the main categories from those two themes. This was the next step. Looking around, with specific quotes from the users for the relationships between the categories.

These relationships are crucial to the design process, for they would be the directives for the next iteration in the prototype design. They were going to be used to start discarding some assumptions, reinforcing others and maybe even discover new things implicit within the data.

After shuffling categories around and making sense of the data, four relationships emerged, as described in the next subsections, following the established method in section 4

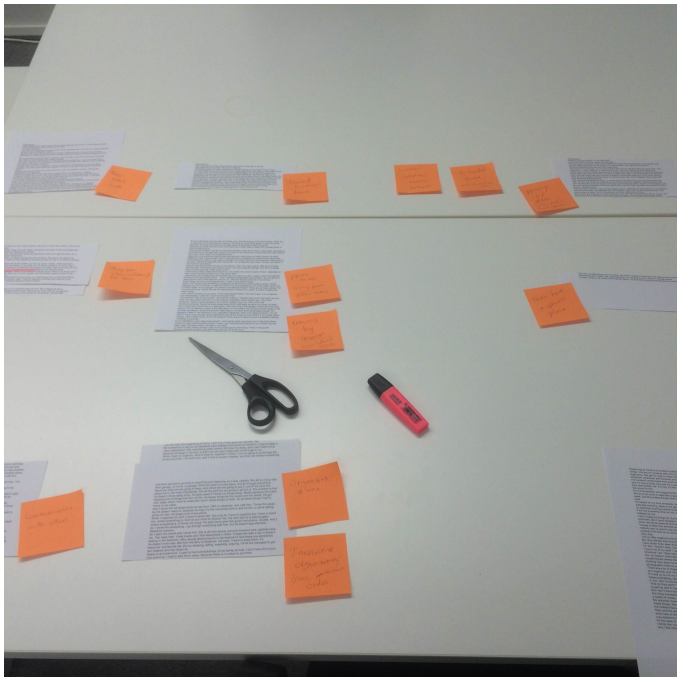

Figure 5.11: Process to find main categories within the qualitative data. The white pieces of paper are the snippets from the interview transcription, Divided in three sections, for each of the themes of the interview. Orange pieces of paper represent the different categories within the interviews.

### 5.3.1 Communication

It was evident from the responses that communication between the members of the house is crucial for all internal processes. Not only in organization but also in matters such as possession and transfers of ownership. When communication links are lost, inconveniences and pains arise for all members of the family that share the home.

This is of extreme importance as it suggests a feature that was not contemplated in the beginning. The fact that organization rituals within the house is a collective thing. Leaving this task to an individual is usually the cause for stress, not only to the one doing the task, but to others, as it involves breaking privacy borders within the home. Some of the categories involved were BDL-Per-Lv. Quotes that support this relationship are:

*"don't organize my drawer. Leave it ugly. I want it ugly"*

*"When I organize his stuff, I have to show him. Not only do I have to organize but I have to teach him, where everything is. And do you think he listens? No, the next day he is asking again where everything is. It drives*

| Interview theme | Main Categories |
|---|---|
| Mental map of homes | Border Definition/Limits(BDL), containers (Ctr), Room-specific activities (RSA), Extended Home(EH), Privacy within areas (Pr) |
| Belongings and possession | Perception of others (Per), Private things within private areas (Pvp), Recalling and remembering (Rcl), Specific Location (Sl) |
| Organization and relationships | Living with others (Lv), Involvement of others (Inv), Organization effectiveness (Oe), Triggers (Tr) |

Table 5.1: Main categories for the main themes of interview

*me crazy!"*

### 5.3.2 Mental Maps

As it turned out, mental maps of the homes were much broader than originally suspected. Users are not very detailed about the specific locations of their things but rather focus on areas where similar objects are stored. Words like *drawer*, *box* or *covert* were not as prevalent as *room* or *area*. Users seem to have mental maps of their homes and their belongings as bigger blocks connected to one another, as demonstrated by categories like Rcl-Sl-Eh. Usually, individual things belong to a BUNDLE which at the same time belongs to a container or area. This would stress the assumption that an extra layer in the structure of the service is needed.

### 5.3.3 Item Values

When talking about how to categorize items or how to give them a value for the family, very few were actually shared by the members of the family. Each person seemed to attach a different value for their items and belongings. Usually ownership increases value, but not necessarily. Sometimes the value of an item is more relevant when the item represents a link towards another member of the family, especially if it is a member that no longer lives within the house. Categories that support this relationship are Lv-Per. What this suggests is that there needs to be, not only communication within the members of the household for the organizing processes, but also for the valuation of the items. If the objective is to get the users engaged within the sharing economy, it is very important that all members of the house can have a saying in what the value of the different items are, before the transfer of ownership can happen.

### 5.3.4 Effectiveness of Organization

Perhaps the most important remark, and the most recurrent one had to deal with how ineffective organizing seemed to be. For some people it involved not only extra work, but lack of satisfaction because organizing only seemed to raise more pains, as expressed in the communication relationship statement. Even though organization seems to help with user's satisfaction, if the it is not done properly users will still find chaos within the order. As expressed by one of the interviewees:

*"He asks me to give him good instructions, visually. And I do, I show him everything, I go through everything with him, but he doesn't pay attention. Selective memory."*

*"So I open the closet and I show him: this is all your space, put your trousers here, pajamas here, etc. Two days later, I look inside and I find electronics in there. I made him take it out, it doesn't belong in the bedroom."*

This suggests then two axes for the organization method for the users in their homes: the level of organization that a person has, or rather, how active that person is at organizing and how effective the person is. A person can organize a lot, or be active at the moment of organizing things at home, however, if the organization only changes the chaos into order but there is no meaning behind that order, the task was futile. There is no point at organizing if structures are not applied. Structures that future users can relate to and use in their mental maps.

I propose the activeness-effectiveness matrix of organization in which the two previously proposed axis are displayed as a Cartesian plane (figure 5.12). How active a person is at organizing is mapped to the horizontal axis and the effectiveness of organization is mapped to the vertical one. The target behavior (as noted in figure 2.1) for the users is to be somewhere within the top-right area of the matrix (shaded area). Anything outside this area tends to cause problems within the users. Being in the lower half of the matrix usually creates problems for the individual, but being in the top-left area usually causes pain for others. This area is very sensitive, as it is usually the one that deals with people who, although are very messy, seem to have a good mapping of their apparent chaos and therefore see no meaning at being actively involved in the organization tasks.

This is can be mapped to Fogg's Behavioral Model with the activeness in organization as the ability to carry out the behavior. The more active a person is, the more ability it requires. Effectiveness can be treated as motivation. The user will want to become more active if the system proves to increase her effectiveness after organizing. The combination of these two items, the desire to be at the top-right quadrant will be the trigger. This is

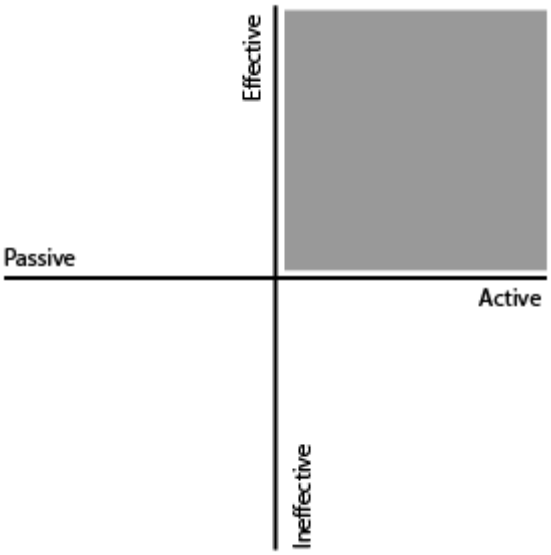


Figure 5.12: Organization activeness versus effectiveness matrix.

still a gray area, though.

Once again, communication tools for the members of the house could help make this problem visible for all and help shift them from the passive side to the active side.

From this round of interviews and analysis I can conclude that in order to make a better service and include the four main relationships found within the interviewees answers it is necessary to insert a new step in the process: CATALOGUING. It is not only organizing that is important for the users, but rather knowing the things they have and being able to share them with the other members of the house. Things have different values and meanings for every member of the household and therefore it is not an individual process.

The objective is now to create a service that will primarily take care of the user's needs within her home in terms of cataloguing. By doing so, she will be encouraged to organize and achieve our desired behavior and eventually engage in the transfer of ownership of some of the belongings, i.e. the sharing economy, as shown in figure 5.13. The cataloguing will be the trigger that starts the process.

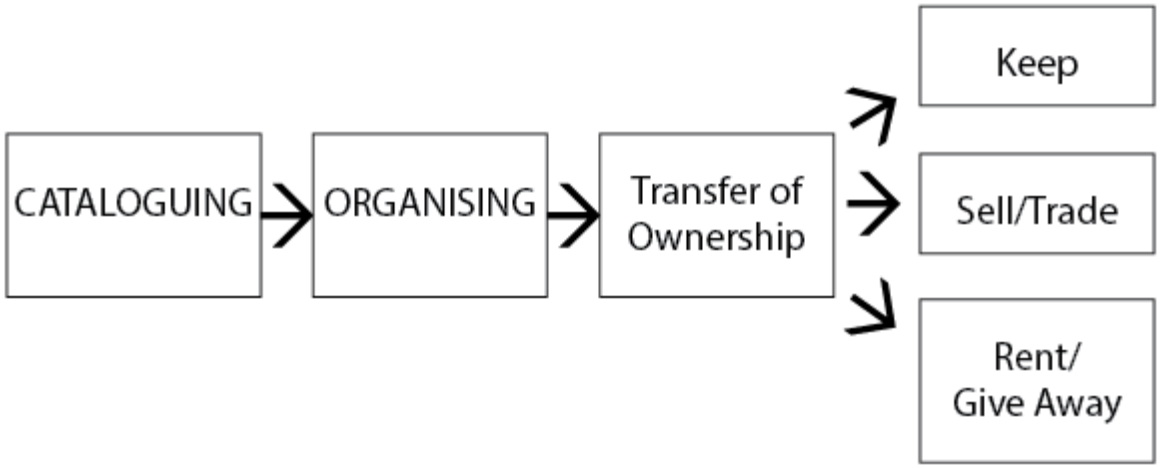


Figure 5.13: Cataloguing as a means to drive organization.

## 5.4 Second Round of Interviews and Data Analysis

Following a similar methodology [36], the data gathered by the second round of interviews was processed and analyzed. This round of interviews was a bit different as there were not so many questions but rather lots of comments coming from the users.

In this round, the same user group that was interviewed during the first one were approached and asked to participate. This time, the idea was to involve technology and digital services in the interview. See how they would react to already existing tools to solve their problems regarding home organization.

The first step was to gather what tools were going to be used. It would be a bad idea to take all the existing solutions that the company had already found, as the list was quite large. Rather, it was decided that three of them would be chosen amongst the list and used in the interviews. In order to be chosen as a candidate, there were three aspects that were considered: Interesting interface and interaction design, Interesting features apart from the cataloguing/storing, focused on home storage/cataloguing. Candidates were chosen among the applications that fulfilled at least two of the three aspects.

From this table it was decided that the following apps were to be used. Priority was given to those that had the right focus:

| Name of Existing Solution | Interesting Design | Interesting features | Right Focus |
|---|---|---|---|
| Boxes (iOS) | X | X | |
| Closet+ (iOS and Web) | X | X | |
| Home Inventory (iOS, Android) | | | X |
| Livible Lables (iOS) | | X | X |
| NestEgg (iOS) | X | X | X |
| RentyThing (web) | X | | |
| Snupps (iOS) | X | X | |
| Sortly (iOS, Android) | X | X | X |
| StreetBank (Web) | | | X |
| Visual Home Inventory (Android) | | | X |

Table 5.2: Analysis of several existing solutions regarding three decisive aspects.

- Livible labels: it's main focus is on cataloguing and storing. It implements the QR code identifiers for the containers and uses them as a revenue stream for the company. Although the app is not very stable, it's focus on QR codes made it very interesting for analysis.
- NestEgg: this application focuses exclusively on cataloguing items around the house. Sorting and organization is a secondary feature. A very interesting feature it implements is the direct cataloguing of items into the system by scanning the bar code of an item, provided it has one. This makes it particularly useful for books and electronics.
- Sortly: among the chosen solutions, this one has the best design. It is colorful yet simple. It seems to follow the graphic design standards and recent trends. It focuses on organizing belongings by setting clear divisions within the house.

As mentioned earlier, it was not within this project's scope to carry out user evaluation and find usability problems, and certainly not within other

apps as well. This round of interviews aimed to see the user's reactions toward the interesting designs and features. Combining these reactions with the directories found during the first round of interviews would finally shine a light towards what kind of product and experience the users want when it comes to organizing at home and engaging in the sharing economy.

Initially it was difficult to get the users involved again. Not only setting up new interview dates was difficult. This time, presenting them with applications to play around with seemed to be also a challenge. The users seem to not respond well to the tools designed to help in this matter, but this was an expected reaction. User personas showed, from the beginning, that they were not going to be very willing to dig deep into using apps or digital tools as aids.

Many of them quickly expressed their dislike for using smart phones, and even more for using applications. This means that the process of home organization is a very personal one, even though it is a collective action within all the members of the house. Somehow, adding a digital layer to the task seems to detach that personal aspect. Therefore, the first big conclusion is that the service to be designed needs to flow very smooth and seem almost invisible to the user.

Upon using the applications users found themselves in a curious state as if they wanted to challenge the different applications and push its boundaries.

The tasks that were set were very simple: make one or two successful inputs of items they had around into the system and play around with the different features.

In order to make it simple for the user, they could choose whether to use their own smart phones and download the applications, or they could use them in phones provided by the interviewer. Except for one user, all of them decided to go for the latter option. They expressed their dislike for "cluttering" their phones with new applications.

The tests ran smooth and these interviews were much shorter than the previous ones, running for 20 minutes on average. One again, all their verbal responses were recorded to be analyzed in the future, and notes were taken regarding their facial expressions or other non-verbal forms of communication.

In the end, the following are the main design directives that emerged from the analysis of the data.

### 5.4.1 App complexity and focus

As one observation that was already noted before starting the second round of interviews, it was expected that adding a new layer of complexity to the

process of organization would put pressure and pain on the users. This was explicitly said by several of them:

*"I don't really understand why do I need an app for this."*

*"Taking pictures of items will not make me become organized. Trust me!"*

But perhaps the most relevant comment was:

*"It takes too long to add an item. I don't really careâ I'm not going to fill in all this useless info"*

What this suggests is something of great importance: the applications that are available have a very different information architecture than the one that the users actually have in their heads.

the user personas suggest that our target users will not be concerned with actually inputting the items or even with starting a cataloguing process. It should come natural after interacting with the tool. Therefore, an item full of details is not what the user personas want. They want ease of use. They want this new layer of complexity to be as thin as possible.

What it suggests then is a new way of thinking of the information within the application. How it is inputted, how it is treated and how it is displayed. Users have mental IMAGES of their possessions. These mental images are usually not accompanied by extensive details. This would be the case for dedicated collectors.

Therefore, what I propose is that user's items are treated as PICTURES within the application. In the existing solutions, an item is usually represented by a number or a name, and the picture of the item is a detail of it. Instead, every new picture that the user inputs is a new item. Yes, the user can retake the picture if she needs to, but this thinking of a picture as a detail of an item needs to be inverted.

Finally, adding QR codes or any other code seems to only increase the perceived complexity of the system by the users. Several of them expressed major dislike on this regard.

*"I do not want to fill my house with these codes. They look ugly and no. I don't want to be using them"*

*"Bar codesâ. I can see how they could be useful. But there are so many things I have that don't have bar codes. I guess I can only use this for books"*

Therefore, it is suggested that QR codes for referencing should be dropped, if the focus is not on collectors but rather on the proposed user personas.

### 5.4.2 On-boarding process

It is evident then, that users of this service will most likely have little to no experience with handling smart phones and/or apps, or if they have, it is not

something they do on a daily basis. Several comments were done regarding this issue, but one stroke particular interest:

*"I wouldn't know how to start using this app"*

If the users do not have high competence in using smart phones it is understandable that they are not used to app jargon or iconography that seems to be standard nowadays, nor would they be willing to explore around with the app for a while in order to discover the different functions, features and key entities within the app.

Therefore, I propose to design an on-boarding experience for the user, as described by Samuel Hulick in his website [2]. An on-boarding experience can be imagined as a set-up wizard, if you will, that will guide her through the initial steps and introduce her to the entities and functions, as well as the different interactions available.

The objective of this on-boarding process is to familiarize the user. Once she has gone through the process, the different features that will be exposed to her in the different views will look more familiar and will make the learning curve a lot smoother for her.

Krystal Higgins has a huge collection of what she calls "first-time user experiences". She documents the on boarding process within many different applications and services around the web. Her website[3] is great reference material when designing these processes.

## 5.5 Information Architecture

This directive came as a result of combining both round of interviews and seeing that there was a connection between what the users expressed in both.

To recap a few of the important results from the first round, it was concluded that the mental maps of users tend to be in a more general form, without much detail. According to users, they don't store things in a specific box, in a specific drawer in a specific location of their homes, but rather, they store things in a specific room, and the shelves, boxes and containers are optional details that they might consider, so long as the item remains inside the specific location.

It was also concluded that complexity was a very sensitive issue to the users. If boxes and containers are details, and users do not want to deal with details, how does it all work out? This is why I propose that the concept of box, or container be removed from the hierarchy tree, as shown in figure 5.14.

[2] `https://www.useronboard.com/` accessed on August 28, 2016

[3] `http://firsttimeux.tumblr.com/` accessed on August 28, 2016

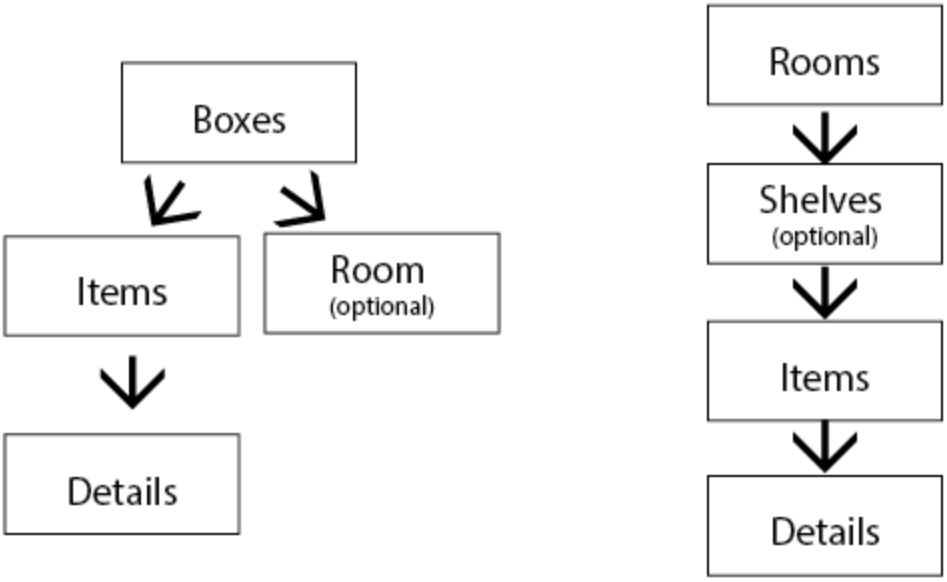


Figure 5.14: "Box-centric" approach (left) and "Room-centric" approach (right)

Moving the system from a "box-centric" approach to a more Room-Centric one. With the big areas and rooms as main stakeholders in the functionality, and the rest acting as optional details, should the user want it to have. If you keep boxes as your main container, the locations within the home, the important parts within the user's mental maps, are only details, and not protagonists, as they should be.

## 5.6 Into the Design

With all this new information, there were a few iterations of wire frames and prototypes done, using once again Balsamiq prototyping tools for ease and quickness of use. Once again, this was done mainly to find a good way to connect all the directives obtained into what would become the first real prototype. This step could have been avoided. However, it is a methodology that I have found to be successful when there are no other designers in the development team to discuss design domains and tracks.


Figure 5.15: First step on the new on boarding process.

The on-boarding process will be designed as a set-up wizard for the user to get familiarized with the different stakeholders and features within the application. In the top we can see a step tracker. This will give feedback to the user regarding in which step she is in as well as help convey the idea that this first time user experience process is short and concise.

The first thing she encounters is that her home should be divided into rooms or spaces. Some default rooms will be shown from the beginning but the user can add as many custom areas as she finds necessary.

Once the user has created the spaces around the house, it is time to introduce the concept of collaboration and communication. For this, the user is asked to add other users to the system. This should be done as invitation method for which the user can provide a contact method for the new members.

The third step is a combination of the prior two steps. It is the combination of areas and users. We introduce the user to the concept of responsibilities around the house. Thus, reinforcing the communication mechanism and enabling the fact that organization and cataloguing is a collective work of everyone involved.

In the final step, the user is asked to enter an initial objective for the system to be aware of. As it has been explained, it is necessary to keep a constant feedback loop between the user and the system and provide reasons for the user to come back. Gamification will be used for this purpose, as it is

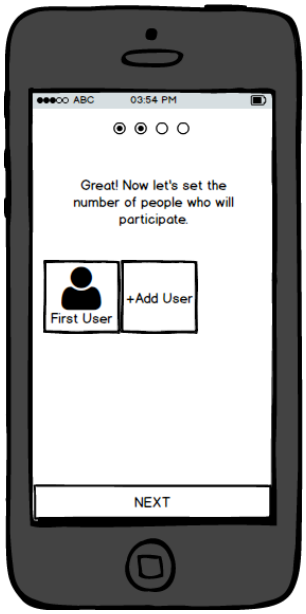


Figure 5.16: Second step on the new on boarding process.

a major source for motivation and can serve as the trigger for the desired behavior (section 2.4), and therefore the user needs to be aware of this feature and concept. Learning from the beginning of the objective-based advancement system will give the first hook for the user to constant comebacks.

Finally, the home screen appears after completing the set-up. Hopefully, there is no need for further tutorials, since the user has already been introduced to the main concepts of the system.

As we can see, this screen has been redesigned for two purposes: first and foremost, to comply with the directive of making the system a more "Room-Centric" approach, to present the areas set by the user from the very beginning of the interaction, and to mimic the original Idean design proposal and have this new service look as similar as possible to the existing application. See figure 5.19 for details.

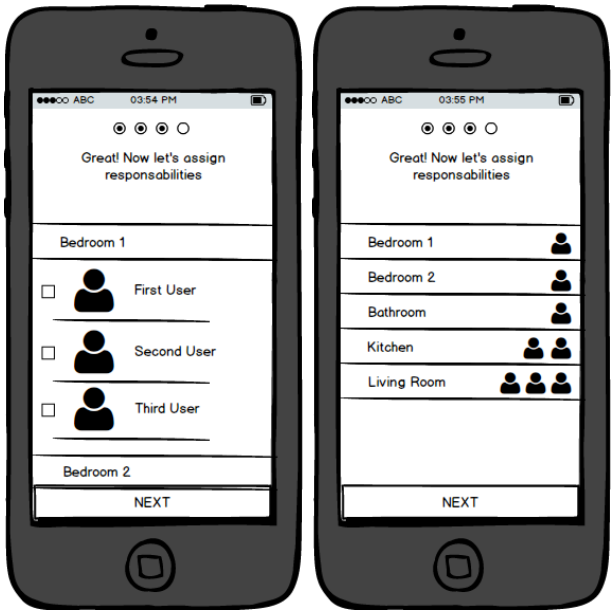


Figure 5.17: Third step on the new on boarding process.

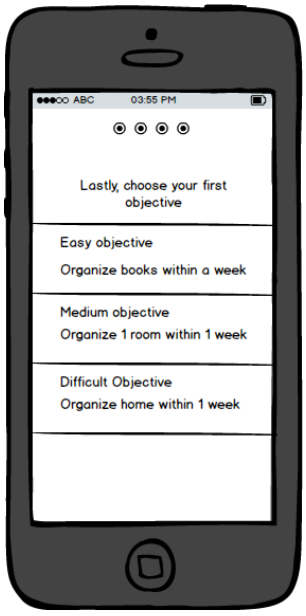


Figure 5.18: Final step on the new on boarding process.

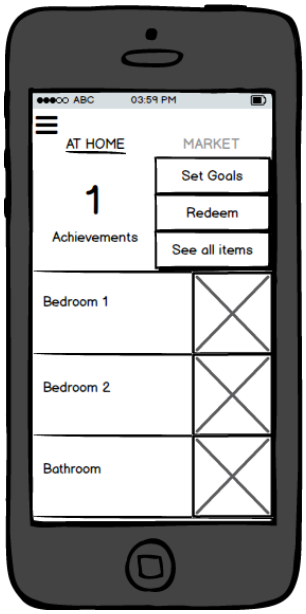


Figure 5.19: Home screen of the new design.

# Chapter 6

# Implementation

## 6.1 The SpaceMaker Service Package

At this point, it almost feels like there is too much information to be put together. A lot of feedback has been gathered from the users, several iterations through wire frames and prototypes and many design domains to be explored.

All of this fits together, like pieces of a puzzle, to form the whole user experience as planned. The following figure will help understand how all the pieces are merged into one whole service.

Looking back at Grönroos' service package model, we see that SpaceMaker has a core service which is the concept of "Self Storage as a Service" (SSaaS). A second layer is set on top of that core service which should act as the enabling and enhancing services. This is done through the cataloguing/organization of items around the house of the user, and the Sharing Economy with the communities around. A final external layer is used as a form of gluing the system together: Gamification. This way, the service is innovative and interesting enough for new users, and through habit forming, we ensure the re-usage of the system as a whole.

## 6.2 Current State of Design

With all this in mind, a final first version of the new service is proposed. Up next I will try to illustrate step-by-step all the relevant elements.

The on-boarding process for the user is quite simple. Using the standard imagery that was already implemented by SpaceMaker, the first thing the user encounters is the logo of the company. This logo has been stripped of colors and left on shapes only, to strengthen the idea of space and openness.

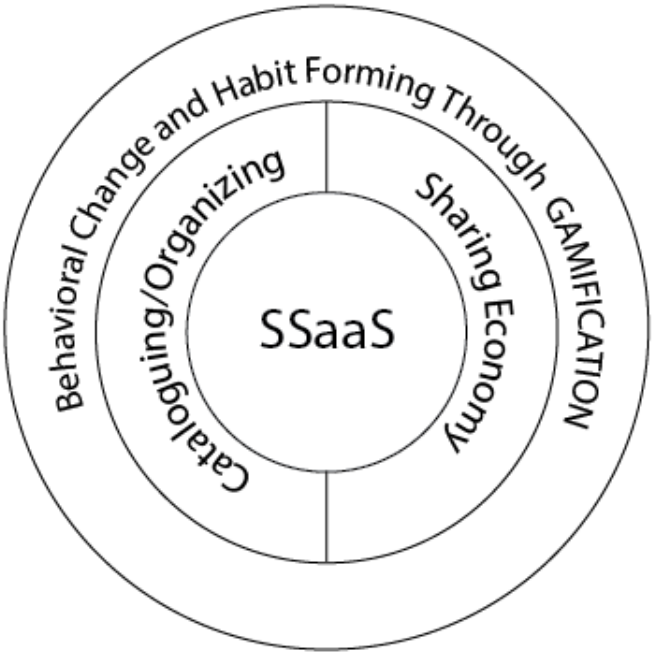


Figure 6.1: Final service package model for the SpaceMaker ecosystem.

The second screen tells the user what this app will do for her and in the third screen the user is informed how the app will help her into achieving the goal.

Notice that upon finishing the on-boarding process, there is an evident call-to-action which will encourage the user to get involved. This is useful as from the beginning, the system is including the user in all the processes. From the very beginning, the user feels she is in control.

Once the user has decided to join the system, a normal sign in process needs to take place in order to start handling credentials from the server side. The first and important step in the set up process is, as expressed in the earlier stages of prototyping, the dividing of the user's home into major areas.

Notice how there is a tracking device on top of the screen to keep the user informed of how much she has completed of this process and specifically, in which step she is at the moment.

This screen is also used to introduce the user to the color scheme of the secondary processes of the system. Fuchsia and black are characteristics of these processes.

Rooms and areas will be one of the most important concepts in the user experience of the application, therefore a lot of focus was given to this stage. Iconography is used in order to make it easier for the user to understand and

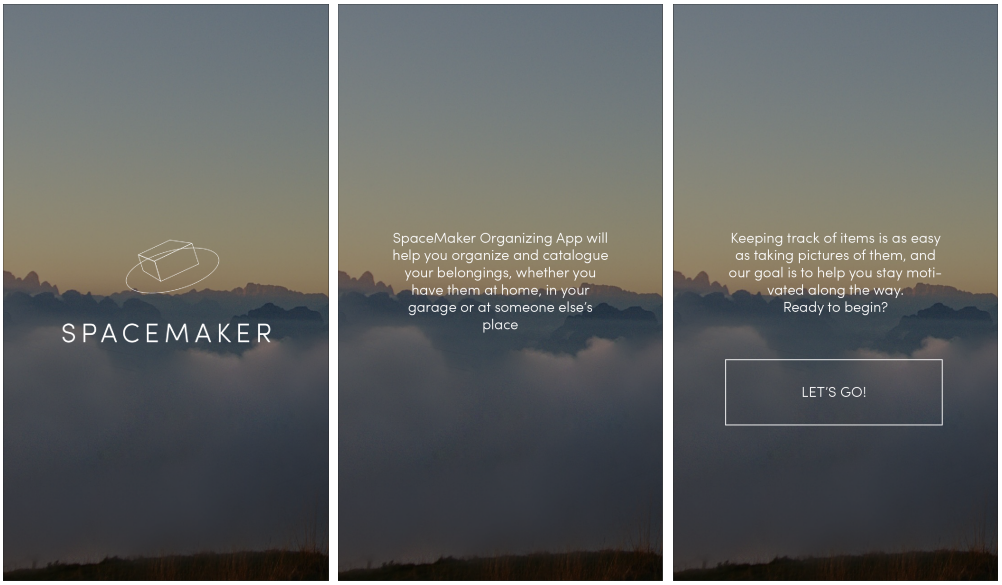


Figure 6.2: On-boarding process for SpaceMaker Organizing App

for future reference, once the icons have been associated with the words. The first suggestions for areas and rooms are give, and they are set to a typical house for the user personas.

Again, call-to-action buttons are easily distinguishable and encourage the user to explore other options for each of the steps.

The next important concept that the user needs to get used to, is the concept of community within the system. This is beneficial for both the user and the company, as the user should get the other people in the house involved by inviting them via email. This can be encouraged later on by the company by offering rewards for successfully referring users.

In this view, the user can interact by combining the previous two concepts of areas and users. By assigning responsibilities around the home, the user gets a better sense of the community and hopefully will trigger initial actions. Again, the main idea is to give the user a sense of control by allowing her to make decisions based on very simple interactions that involved all the previously introduced concepts of the system.

This final step is crucial. In here, two main concepts are introduced: the choice concept that will be used throughout the user experience (choosing something and highlighting it with colors) as well as the gamification aspect. Therefore, little interaction is encouraged in this screen. It is treated more as a tutorial or information screen.

Because the user personas do not show a high interest in technology, it

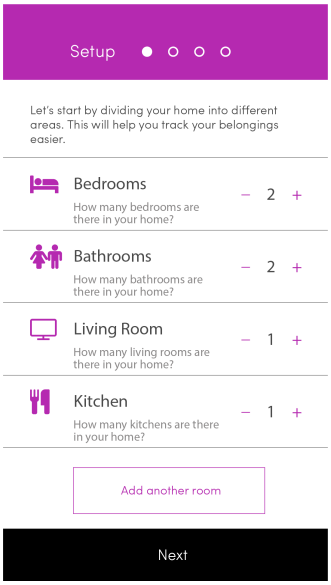


Figure 6.3: First-time user experience (setup) first screen.

is not expected of them to know the concepts of gamification or gameful experiences. In this screen, the user is exposed to the most basic of all concepts of gamification: objectives. This will hopefully show the user that the interaction will be objective-based and that there will be guidance and rewards. The user HAS to chose one of the initial objectives in order to move forward.

Even though there is little interaction expected from the user at this point, choice is always important. Therefore, the three initial objectives need to feel different in difficulty and activities. This will mitigate the lack of interactivity in order to give the user the feeling of control.

This concludes the first-time user experience process. After this, the user will be directed to the home screen of the application. By then, the different buttons and other interactive devices should not seem strange and should not confuse users a lot because they have already been introduced to the main contents.

The home screen is divided into two main parts (two main tabs on the top): home and market. This is done following Idean's initial design of the user's main locations. For now, we will concentrate on the home tab as it is the most important one.

The main thing the user will focus on is the big number in the left of the call-to-action buttons. This informs her on the achievements acquired. Upon tapping on the number, the user is then shown her achievements as noted in

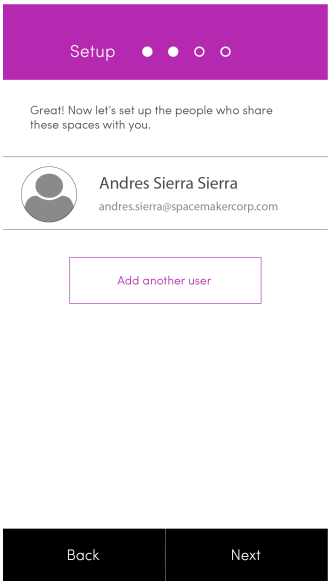


Figure 6.4: Introduction of other users (community) into the system.

figure 6.8.

This view is a secondary process; therefore, it is encased in fuchsia. It is divided into two tabs again. The completed and the ongoing. This is where the user will notice the collection of achievements she has done, her trophies. In the ongoing tab she can see the ones that she has chosen that are still not complete. For each of these, there is a small progress bar at the bottom of the objective. This will serve as reinforcement and motivation for the user. As usual, big call-to-action buttons are available for the user to set new goals.

The user can choose from this screen new objectives to fulfill. Upon tapping on an objective once, she will see the objective details and from there she can chose whether or not to engage on it.

Something important is the secondary interaction introduced here. Not only can the user set new objectives for herself, but she can also challenge other users to do them. The idea is that SpaceMaker will need to be constantly creating new and exciting objectives for the users in order to keep them engaged and participating (Figure 6.9).

Objectives also give out reward points, not just achievements. What this suggests then is a reward based program for customers and prizes for which the user can exchange these points. This was introduced, though not carried forward, as this has more to do with the internal processes of the company than with the user experience. The final flow worth mentioning is the cataloguing aspect of the system. This has not changed much from


Figure 6.5: Third step in the first-time UX process.

the last prototype although it has now been designed to keep the company's theme and ensure consistency.

All rooms are accompanied with a cover image. Initially these will be set default but the user can change it if she wishes, as illustrated in figure 6.11.

Notice how in the bottom, in the item displays, the room is also divided. Initially, there is no divisions and all items added will belong to the room itself. However, if the user wishes to be more specific, she can add shelves or containers within the room in order to make her mental map as similar as possible to the one in the application. Items are added then to a specific container or to the room itself by simply taking a picture of the item. As noted before, items are represented by the picture and not by the details. However, the user can tap on any item, at which point she will see all the details and she can edit them as she sees fit.

One crucial detail about these goals is that they need to be designed in such a way, that the user does not feel like it is a long or exhaustive chore.

As mentioned in the gamification literature, it is of vital importance, that the system is broken down into different features and these should be quantified. Later on, this quantification will provide the goals for the user, always keeping in mind that they should be short and easily accomplished objectives.

This way, the system ensures that all users find a place within. those ones in the bottom left quadrant of the activeness-effectiveness matrix (figure

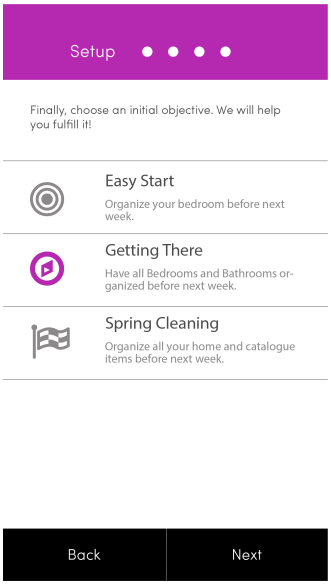


Figure 6.6: Last step in the set up process.

5.12), the *extreme users* will find motivation by completing small objectives at a time, and spread them out over a period of time that they find comfortable, while at the same time, those that are more tending towards the idea quadrant can improve their behaviors by completing more than one or two goals at once.

In terms of the sharing economy issue, it was decided that there was no need for a new community to be formed. The large amount of Collaborative Consumption solutions already available should sign that there is no need for a new one, but rather a re-designing of the concept or the way it is accessed.

In order to expand the SpaceMaker concept into the Sharing Economy and make it part of their enhancement services, I propose that the service becomes an epicenter for the different on line sharing communities around the user.

Just like in the initial set ups, the different concepts of within-home organization were introduced, so can the external parts, such as peer-2-peer lending and renting communities or second-hand market groups available. Thus, the integration not only makes it easier for the user to find the stuff she might find interesting around her, but also posting an item for the transfer of ownership can be more successful if, via the application, it reaches all these different communities at once.

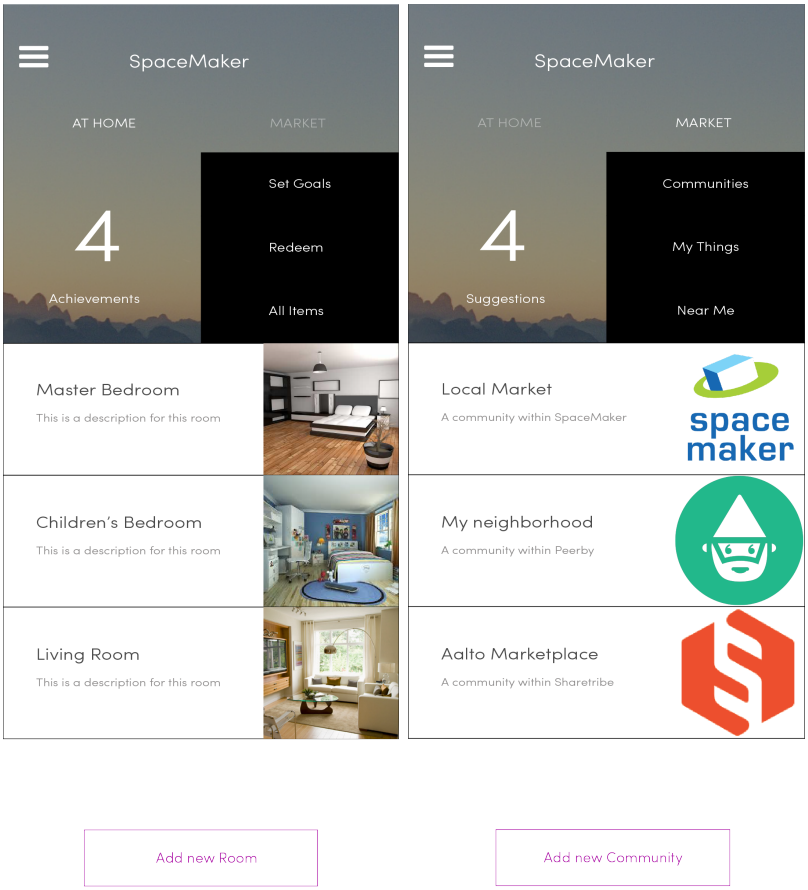


Figure 6.7: Home screen of the application

Groups and sharing networks like Peerby[1] or ShareTribe[2] will act as areas (rooms) within the Collaborative Consumption, and within, the user will find items that can be accessed over it. She can later add or remove communities that she wants and can become more involved in these processes.

This *marketplace* is the secondary location besides home at the main view (figure 6.7). At any point, the user can decide to move items within these two locations, depending on the level of privacy she feels the item should have. Therefore, once the cataloguing process has been concluded, she can start setting up the privacy circles upon which the item should stand.

The idea is then to bring the communities together, and help strengthen

[1] `https://www.peerby.com/` accessed on August 28, 2016
[2] `https://www.sharetribe.com/` accessed on August 28, 2016

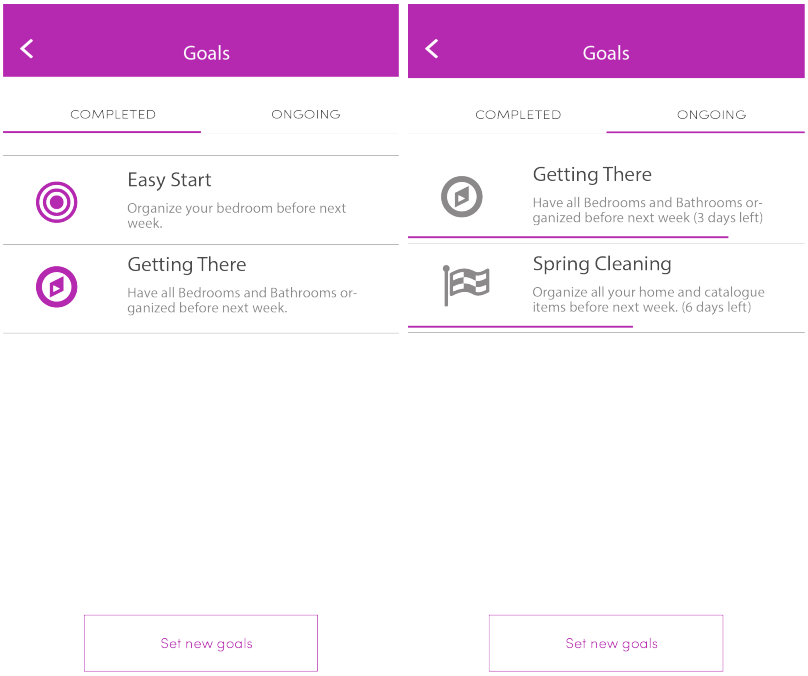


Figure 6.8: Achievements view

these real-life networks with this on-line service. By connecting different communities together, based on location, the security issues can be avoided, as people will be engaging to share and consume with their neighbors. A digital service package helping bring neighbors closer is what the service should aim at.

## 6.3 Challenges

All projects that deal with the involvement of different parts, processes, tools or people will eventually run into challenges. If there were none there would be no learning process and the project would be reduced to a job of repetition. Therefore, I feel it is important to note down the most significant challenges during the 5 months through which this design took place.

The first challenge came upon entering a StartUp to work. As expected, the working team was small but concise. Because of this, there was a lot of work to be done in all aspects. However, it was also a great opportunity as I was presented with a lot of freedom to act and make decisions. From the very first day they encouraged me to look into the company and do something I

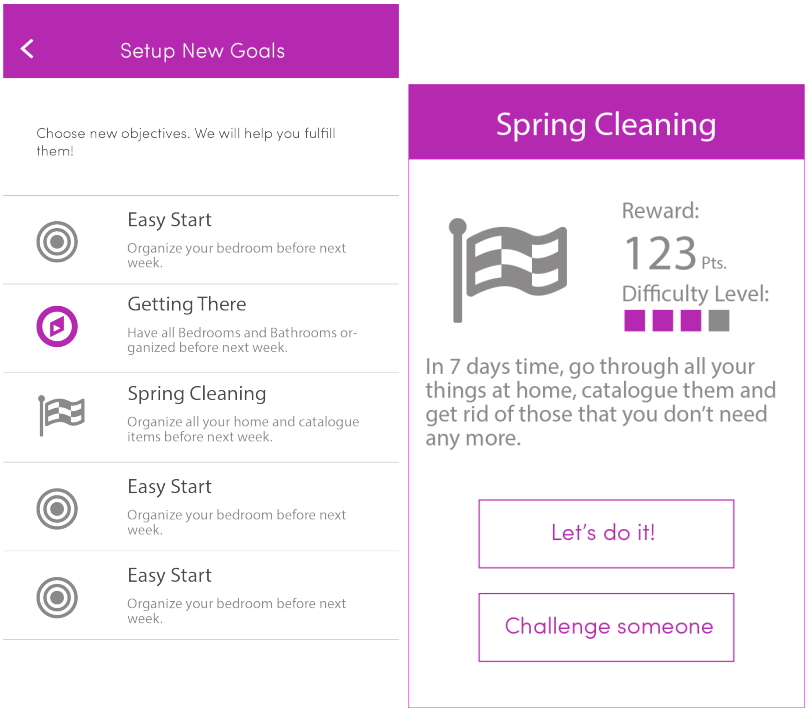


Figure 6.9: Setting up new goals

wanted and am good at, that would benefit the company.

Taking decisions on what tools to use, what design paths to take and what results to show - or even, how to measure the success of these results- was a great learning opportunity.

As mentioned, one of the freedoms I was given was to choose what tools to use for the project. This was a challenge at first, because of the difficulty to have complete access to these tools due to the high cost it can result for the company. Fortunately, many of these tools have student or academic licences specifically designed for thesis work. After e-mailing a couple of the companies, it was easy to get full access without having to pay any fees at all.

Having access to the different tools is a great advantage, but another challenged appeared and it was the lack of a design team within the company. Due to the nature of the StartUp, it was expected that I would not be working on a large team. The company had outsourced the previous design to another company and therefore, there was no need for a complete design team within. This proved to be one of the biggest challenges, as it was difficult to discuss the different design issues and important matters. Many times I had to get together with a colleague who was also having a similar problem to discuss

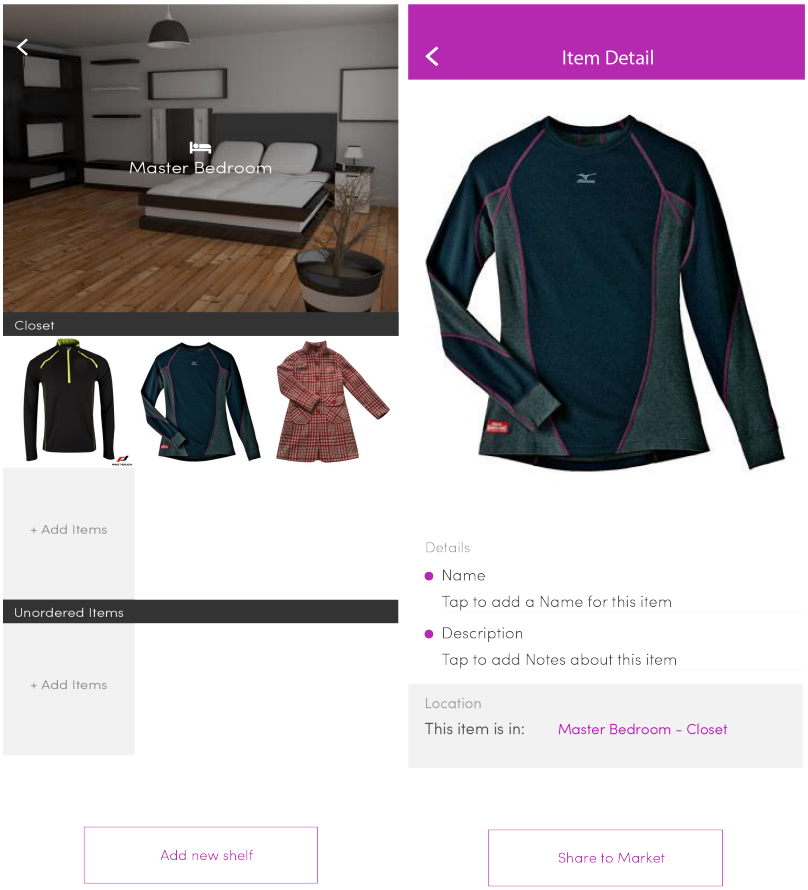


Figure 6.10: Room view and item detail view.

the matters of both companies we were working on.

Finally, having an existing design brief for the company is a great help and a great challenge at the same time. It helps bring down many of the divergent ideas that can be sprouting at some points of the process and can help focus the design on what is really important at the moment. The design team that put together the brief was very helpful and provided guidance. Graphical design had never been my strength, yet I found that by applying my previous knowledge of the available tools, and the restrictions set by the design brief, I managed to create something new for the company, a new product, and keep the look and feel of the previous one at the same time.

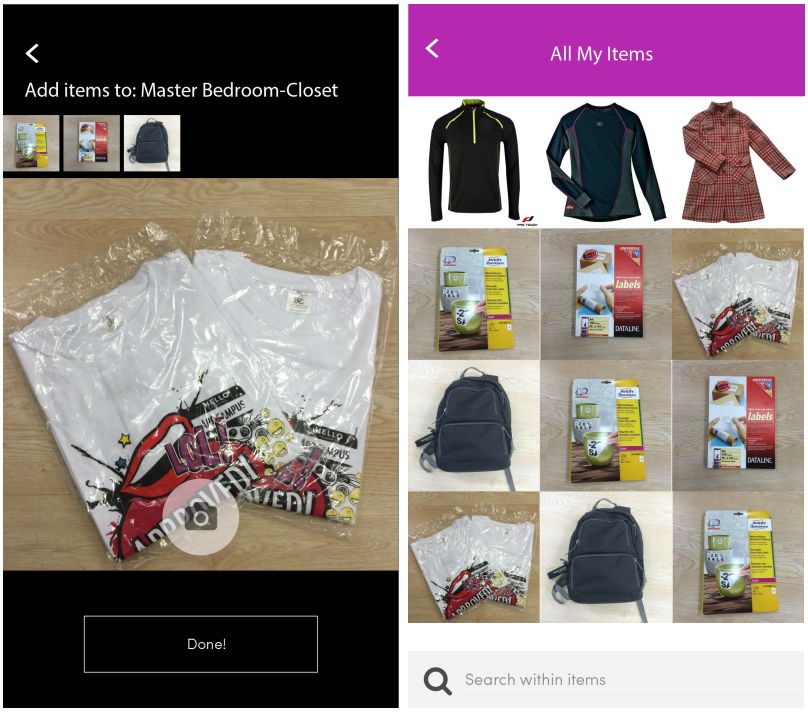


Figure 6.11: Adding an item view (left) and reviewing all items (right).

# Chapter 7

# Conclusions

As stated before, this is no way near the end of the design process for this product; it is but a beginning. However, it is safe to say that the process has been satisfactory and successful.

It was possible to go through the information provided by the company and distill it to the very essence necessary to start thinking of SpaceMaker as a platform for services, rather than a service in itself.

User groups were identified and profiled. With them, the user personas were created in order to have better directions regarding where all design should stand, as the user-centric aspect is one of the pillars of this project. These personas were treated as real-life people and whenever a design decision needed to be made, the priority was to think of the needs and wants of them.

A group of people were also selected as interviewees and research subjects. These were matched accordingly to the user personas to ensure the validity and relevance of their information. Five in total were approached and interviewed. these interviewees were carried in their majority at the subject's home in order to ensure a safe and comfortable environment and have more relevant results. There were 2 rounds of interviews with the same subjects. One round that did not involve technology and only focused on understanding the real user needs and wants. The second round introduced already existing solutions and applications that were targeting those needs and wants, to see their reactions and figure out what specific details and features captured the user's attention the most.

Afterwards, the data was transcribed for further analysis and several directives were identified to make the enabling and enhancing services. These included some implementations regarding gamification aspects and sharing economy principles.

It was found that users do not think of the organizing aspect as important as it would be that of cataloguing. The mental maps of the positions of their

things are usually quite strong and most are reluctant to adopt new ones. However, it is important for them to correctly identify, catalogue and review the different items within their collections.

This is where the most effort was put when introducing gamification aspects, as it is here where there are more quantifiable features to exploit. Also, by helping the user catalogue instead of organize, it is easier to lead them into the participation of the sharing economy, as they will be confronted with their possessions, especially those that can have a transfer of ownership.

Another major finding was that SpaceMaker users do not care so much about the details of the items than how it looks. They do not wish to keep track of these details and found it cumbersome to have to input them manually. therefore, it was decided that instead of thinking of the items as a collection of details (as most other existing solutions available), every picture is an item, not a detail of the item. Further information about it can be inserted upon users request, optionally.

An important result regarding the information architecture of the service, is that users seem to have items as collections within the different areas within their homes. They seem to think more of items as details of the places within their homes (not the other way around). Therefore, it was necessary to design the system to be "home-centric" rather than "thing-centric".

All these findings were taken into consideration for the iterative process that was taking place in parallel: different versions of prototypes were developed. These did not have functionality built, but were done to mimic the user flows as close as possible. Initially, they were all developed in sketch form, and later brought up to look-alike mock ups of the real service. These mock ups were done taking into consideration the design brief that SpaceMaker already had from their previous product. It was very important that the look and feel were the same in order to convey the idea of a service package and not of separate services.

With all of this, the base for the user experience within the new product were completed and presented to the company, with satisfactory outcomes. Initial implementations were started, in order to have an initial working prototype, with all it's functionality.

In conclusion, it was possible to set the initial pillars needed for a good user experience design, as stated by Kuniavsky [28]: Information Architecture, Interaction Design and Identity Design. The results were presented to the company along with suggestions for future work regarding the handling of the information within this project. Ultimately, the set objectives were achieved: there is in fact great potential for SpaceMaker to become a platform of services, not just one solution and there is a way to incorporate the user experience design into the sharing economy in a satisfactory way for the

company.

## 7.1 Future Work

Building a full-fledged product was never within the scope of the project. Rather, the objective was to identify some user problems and lay the design foundation for future products to be built upon. Hence, SpaceMaker should become a package, not just one service.

Because of this, it would be pretentious to state that the design of the organizing app product is anywhere near completion. It is merely at the first stages of design. Much progress has been made to lay these foundations, and in order to build upon them, I propose the following future work:

### 7.1.1 Complete first prototype

Since all the design foundations are already set, both by the Idean company for an over all feel of the platform as well as the specifics for the design of the organizing app, the first logical thing to do is to move unto an initial version of a working prototype.

During the process, a little work was set on this by implementing some of the design on an Android phone using the React Native framework [1]. Within this framework, the graphical interface design can be easily and quickly implemented and it can be later deployed into Android phones as well as iOS devices and soon Windows phone devices. This makes it a pretty good choice for prototype implementation.

Within the React Native prototype, all the interactivity and user flows can be set and this will serve as connection to the next step.

### 7.1.2 User testing

Some assumptions were taken during the initial process of design, including the demographics for which the product was to be designed as well as the basic motivations for which the users will start engaging with the product.

This is the main reason why a user testing needs to be done as soon as possible, once the first prototype is complete. Not only to validate the assumptions, but to find out other ways in which users can be approached and motivated.

[1] `https://facebook.github.io/react-native/` accessed on August 28, 2016

This should be done carrying another iterative process in which small changes should be implemented after every round of user testing and observation.

### 7.1.3 Into the Sharing Economy

One big assumption that was made is that there is no need for further Sharing Economy communities to appear around in peoples locations. There are already plenty of Collaborative Consumptions solutions out there but perhaps what is lacking is the connections between them.

As its name implies, collaborative consumption should be empowered by connecting, not only it's members, but each other, and here is where SpaceMaker comes in.

Acting as a centralized merging system for these solutions, the product could become a more efficient way for users to engage in the Sharing economy. Therefore, something that needs plenty of research and work is finding these communities around the places where the product is being deployed.

Some have been mentioned throughout the development of this project, but many more exist and could be potential partners in this service.

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